

NETWORK WORLD

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POLICY PERSPECTIVES

Huber reflects on regulatory regime

Peter Huber is the special consultant to the U.S. Department of Justice who prepared the triennial report on the breakup and deregulation of AT&T and the regional Bell holding companies. In his voluminous report, entitled "The Geodesic Network: 1987 Report on Competition in the Telephone Industry," Huber presented evidence that supports the idea of allowing the RBHCs to enter three previously proscribed markets: interexchange transmission services, telecommunications equipment manufacturing and information services.

Huber is an attorney and a writer. In addition, he is a former engineering professor at the Massachusetts Institute of Technology. Huber holds

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► LOCAL NETWORK STRATEGIES

USAF outfits bases with broadband LANs

Five nets offer "heterogeneous connectivity."

BY MARY PETROSKY

West Coast Correspondent

DAYTON, Ohio — As part of a five-year, \$120 million networking project, the U.S. Air Force Logistics Command (AFLC) is installing a series of broadband local-area networks thought to be the largest of their kind in the world, *Network World* learned last week.

At least 8,000 host computers, terminals, personal computers and peripherals will be linked to broadband nets at each of

five bases where the Air Force maintains Air Logistics Centers (ALC), according to Anne Sloane, program manager for local-area networks at the AFLC. The AFLC, headquartered here, is two years into the project, with 7,000 connections already installed across the five sites, she said.

The ALCs are responsible for maintaining the Air Force's aircraft and weapons systems, and each network will support the procurement, management and distribution systems needed to keep the ALCs' See page 8

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► REVAMPED REGULATIONS

FCC delivers rate cap plan

User safeguards proposed in heralded scheme.

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — The Federal Communications Commission last week unveiled its long-anticipated rate cap plan that would give AT&T and the regional Bell holding companies greater freedom in setting telephone rates. The proposal includes safeguards to protect consumers from what the agency called anticompetitive abuses.

The FCC proposal would See page 6

Overhauling rate regulations

How current rate-of-return rules work:

AT&T and the BOCs can recover costs and a predetermined level of profit for provision of interstate telephone services. The FCC periodically adjusts the profit level, or rate of return. Lower costs must be passed on to customers in the form of lower rates.

How the FCC's proposed rate cap plan would work:

The agency would freeze current rates and then allow carriers to adjust them annually based on an as-yet-unspecified formula. That formula would be based on changes in productivity, taxes, inflation and access rates. Proponents say the plan will help users because carriers could keep profits generated by cost cutting and network advances.

NETWORK LINE

News

► The Corporation for Open Systems signs up three prominent new members and says it will soon ship its first testing software to users. Page 2.

► Novell, Inc. is ready to

debut next week a new version of its NetWare operating system, replete with 100 added features, including significant network management upgrades and security enhancements. Page 4.

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through a subsidiary, an activity barred by the MFJ. Page 5.

► In a show of unity, value-added network service rivals Tymnet and Telenet rally their largest customers to fight the FCC's proposed VAN access charge plan. Page 8.

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► Plagued by cost overruns and reliability problems, Cole National Corp.'s Retail Information System project was threatened with cancellation. Then an ambitious redesign by the corporate telecommunications department turned the operation around. Page 33.

► FOLLOW-UP

Users respond to AT&T's ISDN plans

Dates, locations questioned.

BY BOB WALLACE

Senior Editor

AT&T's implementation plan for the ISDN primary rate interface (PRI), revealed in an internal status report obtained by *Network World*, last week drew fire from some of the carrier's largest customers.

The heads of two of AT&T's most influential users groups — the System 85 and Enhanced Private Switched Communications Service (EPSCS) users groups — and

AT&T's deployment of ISDN PRI support will affect delivery of a new cost-cutting ETN feature. See page 4.

communications managers from other major corporations commented on the report. Some users voiced concern about the network nodes AT&T has initially slated to support Integrated Services Digital Network's PRI. One user also said he was unhappy that his company was not See page 38

► POINT-OF-SALE NETWORKS

Bankers' group to publish POS rules

BY JIM BROWN

New Products Editor

WASHINGTON, D.C. — In a move that could spur wider deployment of debit card networks, a task force of the American Bankers Association (ABA) is expected to publish guidelines later this month de-

fining on-line point-of-sale network transactions, guideline authors told *Network World* last week.

By defining such things as electronic message formats and pinpointing who carries the financial liability for each transaction, the ABA guidelines will See page 35

► CORPORATION FOR OPEN SYSTEMS

ICA, others join COS; group to ship test tool

BY KARYL SCOTT
Washington, D.C. Correspondent

MCLEAN, Va. — Officials at the Corporation for Open Systems (COS) last week said they had gained three prominent new members — the International Communications Association (ICA), Morgan Guaranty Trust Co. of New York and the Securities Industry Automation Corp. (SIAC).

COS also announced it will begin shipping its first product, the Transport Tester software package, to members this month. The software will allow vendors to test their communications software for conformance to Open System Interconnect (OSI) transport standards. COS declined to elaborate on the product until shipment begins.

Success in recruiting users and shipment of its first product are indications that COS is finally moving out of the start-up phase. COS officials hope these recent developments will dispel skepticism about the group's ability to attract additional user companies.

COS is a consortium of 46 communications vendors and 29 users established to develop systems that test communications products for conformance to OSI standards.

Ted Manakas, COS information products manager, said the new members will bring important insight to COS' testing work. "We expect these members to be very active advocates and to promote the development of interoperable systems that meet the needs of communications users," Manakas said.

"ICA, for example, brings the voice of its 620 members to COS. That has very big implications for us."

ICA and SIAC announced last week they will join COS as affiliates, the most basic form of membership. Affiliates pay annual dues of \$500 in exchange for information on COS standards and testing developments. They are not allowed to attend the COS Strategy Forum or vote on policy issues.

ICA decided to join COS after a lengthy review of the potential benefits of membership. "ICA members have been asking us to get involved in the communications standards arena for some time now," ICA Senior Advisor Chester Bellairs said. "We felt joining COS as an affiliate was a good way to get our feet wet. We decided against voting membership because we're not yet sure how much time we can devote to COS."

SIAC is a jointly owned subsidiary of the American and New York stock exchanges. It designs and manages information systems

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► LOCAL NETS

Firms swap minis for PC LANs

Cite savings and performance gains.

BY MARY LINEHAN
Staff Writer

DALLAS — Lending support to the argument that personal computer networks can outperform traditional computer systems, two large users here have dumped expensive minicomputers for personal computer local-area networks.

Calling their minicomputers cumbersome and slow, the law firms of Johnson & Swanson and Freytag, Perry, La Force, Rubenstein and Teofan abandoned them for the versatility and better price and performance of personal computer networks.

Both firms worked with Strategic Data Systems, Inc. (SDS), a company based here that designs, installs and manages personal computer networks, to set up their nets.

"The gist of our argument is that a minicomputer or a mainframe can't do anything any faster, cheaper or easier than a well-designed personal computer network," said SDS President Jesse Brin. "I'm not saying that all minis are bad and all personal computers are good, but a system's relative worth is in its applications — and a PC network is ideal for a law firm environment."

"The companies we are working with are now opting for personal computer networks because they put more productivity tools into the hands of more people," Brin continued.

Johnson & Swanson got rid of two Data General Corp. and two Wang Laboratories, Inc. minicomputers, valued at \$1 million, that

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► HIGH-END PBX

Siemens preps Hicom switch for U.S.

BY BOB WALLACE
Senior Editor

BOCA RATON, Fla. — Although Siemens Information Systems, Inc. has committed \$100 million over five years and set more than 100 software programmers to work adapting its Hicom private branch exchange to the U.S. market, the switch will not be brought over from Europe for at least a year, Siemens officials told *Network World* last week.

The introduction of the Hicom PBX, which is widely used in Europe, would fill a hole in the switch maker's U.S. PBX product line. Siemens does not build a digital PBX designed for use in the U.S. that can support more than 864 lines. Siemens' largest U.S. PBX, the Saturn III, can handle up to 864 lines.

Of the three Hicom models available overseas, the Hicom 600, capable of handling up to 960 ports, would likely be the first model introduced to the U.S. market, according to Scott Augerson, systems and network group manager for Siemens. He said 1,200 to 1,400 Hicom 600s are already in use in West Germany, Austria and Switzerland.

The so-called Americanization of the Hicom will be an exhaustive and complicated project. Augerson said a large software development effort would be required to equip a foreign PBX with a single feature such as least-cost call routing.

In order to support Integrated Services Digital Network features, the PBX adaptation will also require hardware additions, such as ISDN chip sets based on emerging international ISDN standards.

Augerson said he is confident Siemens can bring the Hicom to market in less time than it took some of its international PBX competitors to Americanize their overseas PBXs.

One of these competitors, Ericsson, took several years to adapt its MD 110 PBX for use in the U.S. Siemens said its PBX adaptation project began in 1985.

Siemens would seem to have an advantage because it already sells the Saturn family of digital, mid-range PBXs. The vendor has acquired invaluable knowledge of the U.S. PBX market through its sales effort and the creation of an elaborate distribution system.

Siemens is waiting for a finalized CCITT ISDN Basic Rate Interface and an increase in user demand for an ISDN-compatible

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Corrections: The Aug. 3 issue of *Network World* carried a picture incorrectly identified as that of Susan Mersereau, director of telecommunications for Weyerhaeuser Information Systems. We apologize for the error.

The article entitled, "Multi-Tech introduces new 1,200 bit/sec modem" (NW, July 20) incorrectly stated the price for the company's MultiModem212E. The price is \$399.

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mail messaging system that saves transaction time and manpower. **Page 11.**

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Software AG's Net-Pass software will allow net operations personnel to log on to multiple VTAM applications and perform session management tasks. **Page 19.**

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► NOVELL, INC.

New NetWare revealed

Firm opens architecture of software.

BY PAULA MUSICH

Senior Editor

PROVO, Utah — Novell, Inc. is set to unveil next week the latest release of NetWare, which boasts some 100 new features. The company will also repackage the network operating system into three versions designed for different user needs, *Network World* has learned.

NetWare 2.1 reportedly features significant network management and security enhancements and adds support for other networking protocols such as Microsoft Corp.'s Server Message Block, Apple Computer, Inc.'s Appletalk Filing Protocol and Sun Microsystems, Inc.'s Network File System. Novell has also opened up NetWare's previously closed architecture to allow developers to build products that work as extensions to the net operating system, said analysts who discussed the product with Novell.

The new release is scheduled to ship in the fourth quarter of this year, said the analysts, who asked not to be named.

The three versions of NetWare will vary in price and functionality and will be distributed through different channels, one analyst said. "Novell is trying to match the product to the channels of distribution that are best qualified to support it," another noted. Only

the high-end version of NetWare will contain Release 2.1 features.

The entry-level version of NetWare, reportedly dubbed Limited NetWare, will support up to five users per server, but will not support internetworking with other servers. Also, Limited NetWare will not feature fault tolerance or transaction-tracking capabilities. It will be priced at \$1,395 and be distributed through smaller dealers and value-added resellers, according to the analyst.

Advanced NetWare will support up to 100 users per server, allow multiple servers to communicate and provide so-called Level I System Fault Tolerance, which prevents data from being written to bad sectors on the server's disk and identifies the bad sector. It will be sold through larger value-added resellers and priced at \$2,695. Limited NetWare and Advanced NetWare will be available in the first quarter of 1988.

The third NetWare version, known as System Fault Tolerant (SFT) NetWare, will support up to 100 users on Intel Corp. 80286-based servers and reportedly will support up to 250 users on Novell 68B servers. This version will be available in the fourth quarter for a price of \$4,995. It will be sold through NetWare Centers, value-added resellers and Novell's Major Accounts Division.

Release 2.1 opens up NetWare's architecture to allow third-party hardware and software vendors to develop products that can enhance the functionality of a NetWare network. Such products could include larger disk drives or tape backup subsystems that support Enhanced System Device Interface protocols, according to Novell reseller Dennis Passovoy, president of DataLAN, Inc. in Canoga Park, Calif.

Glenn Fund, director of the Greater Boston Area Novell Users Group, explained, "There are two major thrusts to 2.1: It enhances NetWare's net management function and will provide hooks — called value-added processes — for third-party developers to add hardware device drivers and applications."

Fund said he believes users will see the benefits of the open architecture next year, when the third-party products become available. "You'll see the capacity of the server vastly increase, high-performance printers and plotters will be supported on the network, and using the [value-added processes], developers will be able to write communications links to Macs and VAXes," he said.

Net management enhancements make a network manager's job easier, Fund said. "Little was done for individual users, but net managers will see a lot of benefits," he said.

According to analysts, network management enhancements fall into six categories, including job queuing, virtual console functions, performance statistics gathering, security features, logon restrictions and accounting functions. □

► NETWORK WORLD

Box 9171, 375 Cochituate Road
Framingham, Mass. 01701-9171

617-879-0700

Editor
Bruce Hoard
Managing Editor
John Gallant
Features Editor
Steve Moore
Assistant Managing Editor — News
John Dix
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Senior Editors
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Karyl Scott
1273 National Press Building
529 14th Street NW
Washington, D.C. 20045
West Coast Correspondent
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501 Second Street
Suite 600
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► ELECTRONIC TANDEM NETWORKS

ETN advance delayed?

BY BOB WALLACE

Senior Editor

BASKING RIDGE, N.J. — Slower than anticipated primary rate interface (PRI) deployment plans revealed exclusively in *Network World* last week could delay Electronic Tandem Network (ETN) users from obtaining a new feature that AT&T claims will cut their local-access costs by 50% to 70%.

The feature, Tandem Access Avoidance (TAA), reduces the number of access lines needed in ETN networks and requires the use of at least one Integrated Services Digital Network PRI node. According to an internal AT&T study, only six to 10 cities will be equipped with PRI nodes by the end of 1987, and a maximum of 30 will be so equipped by the end of 1988.

However, since AT&T will not say when TAA will be available, it is difficult to ascertain how badly the PRI slowdown will hurt users, many of whom are anxious to deploy the cost-cutting feature as soon as possible.

TAA can be understood by looking at how a typical ETN call is completed. If, for example, an employee of a company with a three-

node ETN network (A, B and C) wants to call from Location A to an end user served by ETN Switch C, the call must pass through Node B.

In this example, the call needs four access lines: one to link Location A to the carrier's network, a second line to move the call out to the intermediate Node B, a third line back to the AT&T network and a fourth channel to complete the call to Node C. By using TAA, one channel is used to access the AT&T long-haul net, and a second is used to complete the call to the remote location.

However, questions concerning TAA's availability may be rendered moot by tepid user response to the feature. Several users contacted last week were less than enthusiastic in their assessments.

Dave Edison, corporate information and communications director for Westinghouse Electric Corp., said his company's ETN network was one of a handful of systems surveyed by AT&T to determine how TAA could benefit users. "We are very much interested in TAA, but we are not certain it will reduce our need for access lines by 50% to 70%," he explained.

Although he termed TAA "technically interesting," Edison added

that because ISDN services and features — including TAA — have not been tariffed, and special gear may be needed to use TAA, it is difficult to determine the cost benefits of the technology.

Another ETN user said his company would likely not benefit from TAA because, when finished, his ETN will not use the AT&T long-distance network.

Dick Brewer, assistant vice-president and voice and data communications manager for the Commerce Bank of St. Louis, said the company is constructing a three-node ETN that will eventually serve roughly 4,000 end users in the state of Missouri.

"I don't think [TAA] is worth waiting for," Brewer said. Because St. Louis and Kansas City — two prospective Commerce Bank ETN nodes — were not on the list of 17 cities due to be equipped with ISDN PRI support, it is impossible for Brewer to determine when TAA would become available.

Tom Frenette, network communications manager for Black & Decker Corp., in Towson, Md., applauded AT&T's plans to offer TAA eventually but added it should be made available sooner. "The biggest drawback to AT&T's plans to offer TAA is that ETN users won't be able to save money as fast as they would like," Frenette said, adding that TAA would make ETNs more attractive. □

► REGULATION

RBHC says subsidiary provided info services

Lawsuit charges Nynex violated MFJ.

BY PAM POWERS

Senior Editor

WASHINGTON, D.C. — In response to a lawsuit brought by a former employee, Nynex Corp. admitted that it has provided information services through a subsidiary, an activity that violates Modified Final Judgment strictures.

In a filing submitted to U.S. District Court Judge Harold Greene on July 26, Nynex responded to Scott J. Rafferty's charges that the regional Bell holding company violated Modified Final Judgment laws by selling on-line information and time-sharing services through its wholly owned subsidiary, Telco Research.

Nynex bought the Nashville-based firm, which markets software and net consulting services, from Contel Corp. last year.

Rafferty is suing Nynex for \$4 million on the grounds that the

Booz, Allen & Hamilton, Inc. in Washington, D.C., said Nynex is only one of several RBHCs participating in businesses from which they are restricted. He cited examples of RBHCs that are participating in manufacturing businesses.

"A number of the RBHCs are doing more than they should be doing under the MFJ, but there's a lot of gray area in which they can operate," agreed Jay McCabe, director of equity research with Nomura Securities, Inc. in New York.

Charles Schelke, a managing director with New York-based Smith Barney, Harris Upham & Co., Inc., agreed. "The MFJ is quite vague about what's permitted and what isn't," he said, adding that the current regulatory climate encourages the RBHCs to enter unregulated businesses.

"Everyone expects Judge Greene to go along with Justice's recommendation that the RBHCs be allowed to compete in areas such as manufacturing and computer services," he said. "It's a matter of when, not if."

Most agree that Judge Greene will loosen the restrictions now

prohibiting the RBHCs from information services and manufacturing. When that happens, Schelke said, Nynex's participation in information services through Telco Research will become a moot point.

"The RBHCs have essentially been pushing against the parameters of these restrictions in preparation for their removal," he said. "They're planning around having greater freedom shortly."

And rather than weakening their case for deregulation, Ringling said he thinks the Nynex lawsuit demonstrates the futility of trying to separate basic from enhanced services. "They flow into one another," he said. "I feel sure Greene will allow the RBHCs into information services." □

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RBHC dismissed him from his position in Telco Research when he "indicated he would object to other unlawful activities Nynex sought to conceal," according to Rafferty's lawyer, Mark Del Bianco. Nynex contends that Rafferty was fired strictly for business reasons.

Nynex's response to the allegations stated that, "Telco [Research] was and is in the business of providing telecommunications management software and related services." Until February 1987, Nynex's filing said, Telco Research sold information services to MCI Communications Corp. and "a small number of customers."

While a Nynex spokeswoman refused to admit that such activities violated the Modified Final Judgment, Del Bianco said, "Nynex has admitted to facts that constitute a violation of the MFJ."

Nynex's alleged violations expose some sensitive issues surrounding the RBHCs' forays into unregulated arenas, where critics said the Modified Final Judgment restrictions are not clearly defined and are seldom enforced.

Fritz Ringling, a principal with

► PEER-TO-PEER NETWORKING

Eicon to unveil X.25 board, LU 6.2 software

BY PAULA MUSICH

Senior Editor

MONTREAL — Microcomputer-to-mainframe communications vendor Eicon Technology Corp., based here, is preparing to introduce what it says is the first X.25 adapter board for IBM's Personal System/2 and software that allows IBM microcomputers to communicate with hosts in a peer-to-peer fashion over X.25 links, *Network World* has learned.

Eicon's Advanced Peer-to-Peer Communications software, which will operate with the company's existing X.25 adapters for IBM Personal Computers and the new adapters for the Personal System/2 line, is currently being tested by a few large users, including one of the U.S.'s largest insurance companies, according to an Eicon distributor. Both the distributor and Eicon declined to reveal the name of the insurance company.

The company, based in the New York area, is considering purchasing 1,000 or more of the adapters and APPC software. The X.25 devices, dubbed APPC modems,

would provide the insurance firm's independent field agents with peer-to-peer host access from IBM Personal Computers and Personal System/2s.

Eicon will unveil the X.25 Personal System/2 adapter, which operates with the new micro-channel bus architecture in the Personal System/2 models 50, 60 and 80, at PC Expo in New York in September. The software, which emulates IBM's APPC/PC software, will be announced and shipped in the fourth quarter, according to Maks Wulkan, Eicon's executive vice-president.

The intelligent adapter cards include a Motorola, Inc. 68000 microprocessor that off-loads LU 6.2 protocol processing from the microcomputer. By off-loading protocol processing, the adapter frees the personal computer's memory and processing power for other applications. IBM's own APPC/PC software takes up a large amount of the personal computer's memory — between 150K and 200K bytes — while the Eicon product requires only 10K bytes of memory, Wulkan said.

The X.25 adapters will also operate with any IBM Network Basic I/O System-compatible local network and networking software, including Novell, Inc.'s NetWare, Banyan Systems, Inc.'s Virtual Networking System and AT&T's StarLAN, according to Wulkan.

In addition to supporting X.25 protocols, Eicon's adapters support IBM's Synchronous Data Link Control protocols. When the APPC software is available, the adapters will be able to run 3270 and LU 6.2 sessions concurrently. The APPC software will support up to nine LU 6.2 sessions.

The Personal Computer and Personal System/2 adapters are available in two versions: a 256K-byte version and a 512K-byte version, according to Robert Putignano, president of Access Data Products, Inc., a New York systems integrator and Eicon distributor that is working with the insurance company.

A stand-alone version that includes a built-in 2,400 baud modem, packaged with 3270 and LU 6.2 software, will be priced at \$1,995. Without the internal modem, the same package will be priced at \$1,695.

The insurance firm will use the adapters primarily for stand-alone remote access, although a few locations will share the devices on what will likely be Banyan local networks, Putignano said. □

Siemens preps Hicom for U.S.

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PBX before introducing the switch in the U.S.

"The Basic Rate Interface and [the Q.931 messaging format] are not yet well enough defined to build products to," Augerson said. "We are also waiting for a noticeable increase in customer demand for a PBX with ISDN features. We have surveyed users and found they are not specifying ISDN," he added. "Users are not saying, 'We want a 1,000-line ISDN system.' They are saying, 'We are having specific communications problems, and we are looking for solutions.'"

In January, Siemens purchased Tel Plus Communications, Inc., formerly the industry's largest independent interconnect, in an effort to widen its PBX distribution channels.

Later, in March, Siemens signed a three-year agreement with NEC America, Inc. that enables Tel Plus to continue selling the NEAX 2400 digital PBX.

Mark Ricca, a vice-president with Eastern Management Group, a Parsippany, N.J.-based communications research firm, said Siemens could become a strong contender in the fiercely competitive high-end segment of the PBX market once the Hicom becomes commercially available in the U.S. □

FCC delivers rate cap plan

continued from page 1

replace the current rate-of-return system that regulates AT&T and RBHC profits with a rate cap plan that would establish price ceilings for interstate services. The commission said it would first implement the rate cap plan for AT&T and later for the RBHCs.

The FCC said it will not consider the rate cap plan for the seven RBHCs until it first has a chance to observe its effect on AT&T. The FCC did not indicate when the rules might be implemented.

"The price cap proposal holds the promise of better protecting the public interest than the current rate-of-return approach by promoting an efficient and reasonably priced telecommunications network," FCC Chairman Dennis Patrick said at the agency's public meeting last week.

"If we can realize that promise, consumers will pay lower prices for telecommunications services and will have a wider variety of service choices."

Under the initial implementation of the price ceiling plan, rates for all of AT&T's interstate services would be frozen at current levels. The plan would allow annual adjustments and would set limits on the amount rates could rise or fall.

Rate changes would be tied to an FCC-determined formula based on changes in industry productivity, inflation, tax law and access charges, said Kathy Levitz, senior legal advisor at the FCC and one of

the principal authors of the proposal.

The FCC claims the new rules will encourage carriers to be more efficient and improve the public network. Elimination of rate-of-return regulation will allow AT&T and the RBHCs to earn higher profits by cutting costs, and the FCC thinks those cost savings will be passed on to consumers. Some observers disagree.

"AT&T and the RBHCs are likely to give those savings to shareholders in order to drive the value of their stock up," said consultant Robert Ellis, president of The Aries Group, Inc. in Rockville, Md. "If they don't put those cost savings back into their capital plant, users are unlikely to see the flood of new services regulators are promising, and they aren't likely to see price cuts."

The FCC denies claims that the proposed rate cap rules are an attempt to deregulate AT&T and the RBHCs.

"This is not a form of deregulation," said FCC Commissioner Mimi Weyforth Dawson. "This is an exploration of a more effective way to regulate the cost of service. It's an effort to encourage carriers to increase innovation, maximize consumer welfare and increase efficiency. We want to eliminate perverse incentives to inflate costs and cross-subsidize."

James Blaszak, attorney for the Ad Hoc Telecommunications Users Committee, praised the FCC for balancing consumer and carrier interests. "I'm encouraged that the FCC is moving in a prudent fashion. The commission is being very

responsive to user concerns about the quality of service in the proposed rules and is giving its full attention to the Communications Act requirement that rates are just and reasonable."

In its proposal, the FCC outlined a number of safeguards designed to balance the consumers' need for regulatory protection from pricing abuses and the carriers' desire for regulatory freedom. The FCC said it will continue to require AT&T and the RBHCs to file tariffs so that regulators can ensure rates are "reasonable."

According to the proposal, the tariffs will be subject to a "streamlined" review process to ensure prompt availability of new services. The FCC also plans to enact a mechanism to prevent AT&T and the RBHCs from earning "excessively high" profits. The FCC has yet to determine how to gauge "reasonableness" and "excessive" earnings.

Commissioner Patricia Diaz Dennis identified a number of areas of concern to ratepayers. "We need to enact safeguards that ensure carriers pass the benefits of these new rules on to ratepayers. We need methods to ensure the quality of telephone service is maintained, methods to determine whether rates are unreasonable and a means to encourage carriers to upgrade the national network continually."

While the commission did not offer any specific ways to implement these safeguards, it asked for public comment on how they could be formulated.

AT&T, its competitors and the

RBHCs expressed support for the commission's rate cap proposal. Bell Atlantic Corp. Chairman Thomas Bolger said, "Rate cap regulation is the right form of regulation at the right time. It addresses consumer concerns by concentrating on price. It gives the industry an incentive to improve earnings by becoming more efficient and by marketing innovative new services."

Nynex Corp.'s Ron Sirch, executive director of federal regulatory matters, said the price cap will give the RBHCs new "incentives to introduce technologies that stimulate use of our network."

Industry observers agree the new rules would be a boon for AT&T and the Bell companies, although the benefit to customers is uncertain.

"I'm not so sure consumers will pay any less for service in the long run," said industry analyst Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C.

"I think we might see more price fluctuation and multiple price tiers — where a high-volume user pays less than a low-volume user, or a customer who makes a three-year commitment for service pays less than a customer with a one-year commitment for the same service," Dzubeck said.

One of the prime areas for cost reductions is the labor force. "We're likely to see layoffs and salary cuts in the regulated businesses of AT&T and the RBHCs," Dzubeck said, "in much the same way AT&T cut costs in its unregulated business after divestiture." □

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NETWORKING

► GOVERNMENT NETS

GSA plan would limit FTS pact

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — Under pressure from congressional leaders, the U.S. General Services Administration last week proposed to cut by more than half the length of the Federal Telecommunications System (FTS) 2000 contract.

In a letter to Rep. Jack Brooks (D-Texas), chairman of the House Government Operations Committee, GSA Administrator Terence Golden proposed to limit the federal government's commitment under the contract to less than four years, rather than the maximum 10-year commitment now planned. Brooks had pressured the GSA to abandon plans to select one prime contractor and instead award two vendors the contract for the \$4.5 billion net upgrade project.

Under Brooks' scheme, the two providers would divide FTS 2000 revenue on a 70%-30% basis, and the contract would be up for bid every three years.

Golden rejected Brooks' proposal and offered to limit duration of the pact to a minimum period. He estimated the government would spend less than \$3 billion during the four-year period. Golden proposed that, after that period, the government would evaluate whether to remain with the current vendor, ask for revisions or reopen bidding for the contract. He said he opposes delaying bidding to rewrite the contract to call for two vendors.

In his proposal to Brooks, Golden also called for the creation of an independent panel to counsel GSA and Congress on the contract award.

Sen. John Glenn (D-

Ohio), chairman of the Senate Government Affairs Committee, has also expressed concern about the limited competition for the FTS 2000 deal, the largest telephone network contract in history. Glenn wrote to Golden asking that competition for the contract be halted and a new set of rules introduced.

The FTS 2000 network will supply 1.3 million federal users with state-of-the-art voice, data and video communications.

Only two teams, led by prime contractors AT&T and Martin Marietta Corp., remain in competition for the contract. Final bids for FTS 2000 are due Aug. 31. The AT&T team comprises Boeing Corp., Computer Sciences Corp. and the regional Bell holding companies. The Martin Marietta team includes MCI Communications Corp., Northern Telecom, Inc. and the RBHCs.

Martin Marietta said this week it will pull out of the competition if bidding is delayed further. AT&T said it isn't opposed to a multiple-supplier contract. □

► VALUE-ADDED NETWORKS

Tymnet, Telenet join to fight FCC

BY BOB WALLACE

Senior Editor

RESTON, Va. — Arch rivals Tymnet/McDonnell Douglas Network Systems Co. and Telenet Communications Corp. are joining forces to fight an FCC proposal to levy steep access charges on value-added network (VAN) service providers.

Top management representatives of the two premier VANs have scheduled joint meetings with their largest customers in an effort to rally them in opposition to the Federal Communications Commission's access-charge plan, which Telenet claimed would raise its daytime VAN rates by 60% to 100% and its evening and weekend rates by as much as 500%.

Officials of both Tymnet and Telenet acknowledged the joint meetings. One ma-

jer California-based Telenet user said his company has agreed to participate in a meeting scheduled for next week. He said Telenet explained that FCC officials may be invited to attend the meetings.

In a July 23 letter to users, Telenet President Paolo Guidi said user opposition could derail the FCC proposal. "If a large number of users express opposition to the FCC proposal and demonstrate its serious adverse impact, the proposal can be defeated or altered," he said.

The FCC proposal would eliminate the access-charge exemption VANs have enjoyed since 1983. All enhanced interexchange data communications service providers would be required to pay access fees to local exchange carriers for providing dial-up access to their networks. □

USAF outfits bases

continued from page 1

operations running smoothly. The ALCs keep track of parts in stock, reordering, repairs in progress, funds and reliability and maintenance records, among other things, Slone said.

TRW, Inc.'s Systems Engineering Development Division is the primary contractor for the \$120 million project and is handling systems integration. TRW's Information Networks Division (IND) is responsible for the cable plant design and is supplying network components, while another TRW division is handling network support, according to Robert Spinelli, assistant general manager for TRW IND in Torrance, Calif.

"The AFLC is looking for heterogeneous connectivity," Spinelli said. "This was a huge construction project. The real complexity and challenge of the network was finding an architecture that met their needs. Network management was also a big concern," he added.

Many of the applications being developed as part of the logistics-modernization program call for heavy data base inquiry against a range of host computers. The ALCs currently have hosts from a variety of vendors, including IBM, Amdahl Corp., Tandem Computers, Inc. and Digital Equipment Corp.

The network will be a backbone supporting more than a dozen ALC programs, each with its own hardware and software requirements. Initially, it will carry asynchronous terminal-to-host traffic. The various batch-oriented information systems at the ALCs are being updated to on-line, real-time systems, Slone said. This will provide quicker access to information on the status of repairs and parts in inventory, which in turn will help reduce the acquisition time for spare parts and streamline the maintenance process. The goal is to reduce the number of aircraft grounded for repairs.

The networking project began early in 1986 with the installation of several buildingwide networks at each site. Subsequently, TRW began laying trunk cable to connect the approximately 190 buildings on the five bases. This "trunking" phase is expected to be completed by year

end, Slone said.

Broadband cable is being installed at each base to create a single large network per site. Some fiber cable is also being installed to accommodate future needs. Groups of buildings will be wired as specific applications come on-line. The AFLC is using TRW's 2M bit/sec network. The connection price per port is less than \$500.

Each of the five networks will support a number of subnetworks, which connect multiple buildings. Devices attach to the subnetworks via terminal servers that TRW calls Intelligent Connect Units (ICU).

The bases have an average of four subnetworks, and each network could grow to 10,000 connections with approximately 300 devices per channel, Spinelli said.

Hundreds of miles of cable are being laid. The ALC at Tinker Air Force Base in Oklahoma City, for example, has 20 miles of trunk

cable and roughly 200 miles of drop cable, Spinelli said.

The largest building at Tinker has 14,000 drop cables and could support up to 5,000 devices, Spinelli added. "We don't really know what the maximum capacity is — it depends on how you configure it."

The ALC networks will be interconnected through the Defense Data Network, which currently operates at 9.6K bit/sec but is being upgraded to accommodate T-1 speeds of 1.544M bit/sec.

Broadband was chosen for its ability to support multiple channels, Slone said. This was attractive because it allows for expansion and supports what Slone calls "value-added applications" such as video.

The networks are initially supporting asynchronous traffic. Support for synchronous communications will be added later, Slone said. □

ICA, others join COS

continued from page 2

for its parents and other securities companies throughout the U.S.

SIAC joined COS to "effect the timely development of interoperable computer systems and networks," said Avner Gelb,

director of advanced systems engineering at SIAC. "Right now, we have to rely on costly and inefficient custom-designed interfaces and gateways to interconnect our networks," Gelb said. "We hope COS will foster collaboration between users and vendors in the development of standard interoper-

able systems."

Morgan Guaranty, a New York-based bank, joined COS last month as a voting member. Voting members such as Morgan Guaranty pay annual dues of between \$25,000 and \$200,000 depending on earnings, attend the Strategy Forum and participate in standards committees. □

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INDUSTRY UPDATE

MCI appoints new chief financial officer

Following the resignation of Chief Financial Officer William E. Conway, MCI Communications Corp. last week appointed Daniel F. Akerson to the same post. Akerson has been president of MCI's Southeast Division since 1985. With his appointment, effective Sept. 1, Akerson also becomes a member of the MCI Management Committee.

► SECOND-QUARTER FINANCIALS

RBHCs fighting for profits

Earnings are down for five of seven Bells; revenues are up.

BY PAM POWERS

Senior Editor

In recent weeks, five of the seven regional Bell holding companies reported earnings declines, although with the exception of Southwestern Bell Corp., revenue rose across the board. While each company had individual cost pressures adversely affecting their bottom lines, they shared some common expenses.

The declines come after years of escalating earnings growth for the

RBHCs and are attributable to depreciation expenses, corporate restructurings, shrinking access charges, decreasing allowable rates of return and increased pressure from unprofitable unregulated subsidiaries.

"We anticipated depressed earnings for the RBHCs' second quarter. Growth has been good but not terribly exciting, and they've taken a number of hits recently," said Joel Gross, vice-president of research with Dean Witter Reynolds, Inc. in New York. "Most of these

pressures will be around for a year or more, but the outlook is still bright."

The RBHCs have been subject to rate-of-return regulations as mandated by the Federal Communications Commission since divestiture. But in 1986, the rate was lowered from 12.5% to 12.2% of revenue. Any profit made over that is to be reinvested in the company or passed on to customers in the form of lower rates.

While the rate-of-return decrease is itself relatively small, an-

alysts said the RBHCs have periodically earned above the allowable rate without reinvesting or lowering rates. For that reason, they are now being more closely monitored by the state public utility commissions (PUC). The PUCs generally follow and enforce the FCC's recommendations for rates of return, although some have independently established rates.

"The RBHCs raked in tremendous profits over the last few years — way above the authorized rate," said Jeff Close, a senior consultant with DMW Group, Inc. in Ann Arbor, Mich. "Now people are screaming about that, so the pendulum has swung the other way."

Pacific Telesis Group this quarter is one RBHC that was directed by the California PUC to refund

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INDUSTRY EYE

PAM POWERS

Tracing product evolution

Product markets in the communications industry resolutely follow an evolutionary pattern. In the early stages, a new product is introduced by one or two vendors that are risking uncharted territory but are likely to make a killing if the product concept catches fire.

The T-1 multiplexer market was like this four years ago, and companies such as General DataComm Industries, Inc., who broke the ground, profited handsomely in that nascent stage of the market.

Users, on the other hand, can be at a disadvantage if they purchase a product in its early stages. It's likely the vendor will offer preferential treatment to the early user. When the product is untried, the vendor desperately needs users to champion its virtues. But competition has not yet been introduced, so both price and product performance have yet to reach their optimal level.

In the second stage, competition escalates, and the potential user base expands to accommodate it as users come to accept the product as established technology. At that point, invariably, someone throws a wrench into the equation by producing a more sophisticated version of the product. Witness again the advent of the T-1 networking multiplexer.

With Network Equipment Technology, Inc.'s (NET) and Timeplex, Inc.'s appearance on the scene, General DataComm's thunder was stolen and the market gravitated to the product's new, improved version, leaving NET

and Timeplex to the spoils.

The third stage is typically the most difficult for the vendor but the most pleasant for the user. The modem market exemplifies the dynamics at work in the third stage: The product has become a commodity, meaning there is little discernible difference among offerings and vendors compete fiercely on price for business.

The low-end statistical multiplexer market has arrived at this third stage as well, as evidenced by the steady price erosion and declining profits of vendors such as Micom Systems, Inc. and Paradyne Corp. Such companies are left with little choice but to seek an alternate revenue stream by delving

into new markets.

In the final stage, a product market can disappear completely, as users migrate to a newer, more sophisticated generation. The first-generation private branch exchange market went down the tubes when second- and third-generation products debuted. Sales of the first and second group of facsimile equipment have been eroded almost entirely by the next generation.

Or, in an alternative scenario, a product can be subsumed into another product. For instance, the stand-alone protocol converter has, in some cases, become a standard feature of switching equipment.

Some predict that the packet assembler/disassembler, now a stand-alone product, will travel the same route to become an integral part of packet switches. □

Multiplexer makers post quarterly earnings

For the quarter ended June 30	1987		1986	
	Revenue	Earnings	Revenue	Earnings
Paradyne Corp.	\$58m	(\$1.5m)	\$67.1m	\$.5m
Micom Systems, Inc.	\$49m	\$2.9m	\$46.2m	\$1.5m
Timeplex, Inc.	\$40m	\$4.7m	\$30.5m	\$1.9m
Digital Communications Associates, Inc.	\$28.4m	\$6.9m	\$14.9m	\$4m
Infotron Systems Corp.	\$20m	\$.17m	\$21.7m	\$.89m

► REORGANIZATION

PacTel Spectrum resculpts strategy

WALNUT CREEK, Calif. — PacTel Spectrum Services, an unregulated subsidiary of the Pacific Telesis Group, is reorganizing to support an array of network management services scheduled to be announced within the next few weeks.

PacTel provides network management services for users whose facilities are too small to justify installing large-scale diagnostic equipment or hiring a management center staff. The firm monitors its customers' networks with diagnostic software and, in the event of a problem, orchestrates the repair process. PacTel also implements network changes on a full-time basis.

According to Amy Damianakes, a PacTel spokeswoman, many customers have been looking for help with a single net management problem or maintenance on a part-time basis, instead of the 24-hour, seven-days-a-week, all-encompassing service the company offers today.

"We were set up to offer the service as a whole, so we had to turn away potential customers who wanted help with specific problems on a part-time basis," she said.

As a result, PacTel will introduce in the next few weeks a more flexible service offering, Damianakes explained. She declined to give complete details regarding the service announcements. To accommodate the changes in its service, the company has been reorganized.

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► SECOND-QUARTER RESULTS

Northern Tel does well

BY JOY KALFOPOULOS

Network World Staff

NASHVILLE, Tenn. — Citing strong growth in central office switching sales, Northern Telecom, Inc. recently reported \$73 million in net earnings for its second quarter 1987, marking a 26% increase from last year's second quarter.

Analysts said sales in central office switching were depressed last year when Northern Telecom was unable to deliver the software for the central office switching lines to its customers on time.

This year, however, the firm has seen a marked improvement in the shipment of central office switching peripherals and software enhancements, analysts said. Northern Telecom is the supplier of the DMS family of central office switches and Meridian SL Integrated Service Network private branch exchange systems.

"Since they couldn't deliver the product, they didn't book the sales," said Mike Kennedy, vice-president of strategies in telecommunications at Stamford, Conn.-based Gartner Group, Inc. "But now they've overcome that problem."

The company's consolidated rev-

enue reached \$1.25 billion in the second quarter ended June 30, compared with 1986's second-quarter figure of \$1.07 billion, marking a 17% increase.

Kennedy also indicated that Northern Telecom has bettered its competitive position in the central office switching market. "Its recent announcement of a new architecture and enhanced processor for central office switching [DMS Supernode] puts Northern in a stronger competitive position against AT&T," Kennedy said.

Theodore J. Moreau, telecommunications analyst at Milwaukee-based Robert W. Baird and Co., Inc., an investment brokerage firm, said Northern Telecom's earnings improvement was due to increases in both central office switching and PBX sales.

Calling Northern Telecom the only profitable PBX supplier, Kennedy said the company offers no-frills PBX systems at lower prices while still providing all the necessities a PBX needs to run efficiently.

Moreau also said the company is showing good revenue growth in the transmission area. He added, however, that profits have not been improving in that sector. □

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RBHCs fighting for profits

continued from page 9

customers money it had earned above the allowable rate of return, a move Pacific Telesis cited as having "a significant impact" on its quarterly earnings. The commission has recommended that Pacific Telesis reduce its rates by as much as \$225.1 million a year.

But Harry Carrel, an analyst with Northern Business Information, Inc. in New York, said the RBHCs "aren't interested in breaking the law" and probably have not often exceeded their allowable rates of return.

He cited other factors as contributing to lower earnings. Access charges, which are paid to the RBHCs by the carriers and end users for access to the local loop, have fallen lately as the burden of the charges is shifted from the carrier to the end user, he said. "The rates the end user is paying to the RBHCs aren't going up as fast as the rates the long-distance carriers pay are declining," Carrel said. "End user payments are not yet compensating for the carriers' lower rates."

The RBHCs uniformly attributed a significant portion of their second-quarter expenses to increased depreciation expenses. As they upgrade their central offices to digital equipment, the actual value of their base of analog equipment has depreciated more rapidly than its paper value. US West, Inc.'s depreciation expenses were 11% higher this quarter than they were the same period last year. Pacific Telesis' were about 10% higher.

BellSouth Corp., whose earnings declined 3.5%, attributed the slide primarily to depreciation and a charge against earnings for expenses incurred as part of an early retirement program it instituted this quarter. Tom Crawford, a BellSouth spokesman, said 1,100 managers signed up for the program in the quarter, costing the company \$26.7 million in severance pay and other costs associated with company consolidation.

Early retirement programs, restructuring plans and layoffs fac-

tored into other RBHCs' third quarter.

US West's third round of consolidations since divestiture, initiated during the first quarter of this year, has eliminated 1,400 manager positions. "The business is becoming more competitive," said Jerry Brown, a US West spokesman. "We feel we have to operate with fewer people." In July, Bell Atlantic Corp. also announced a major restructuring.

Gross said several of the RBHCs suffered blows to their bottom lines because of layoffs, and he said he expects continued downsizing to affect the companies' earnings for a few more years.

The RBHCs are loath to agree, but analysts contend that the cost of diversifying into unregulated businesses has taken its toll on earnings. "As a whole, the RBHCs have made some questionable acquisitions," Gross said. "Their earnings this quarter to some degree reflect losses contributed by the unregulated side."

Carrel agreed, saying the unregulated operations that "the RBHCs have no experience running" helped depress their quarterly profits.

US West's telephone operations contributed \$269.2 million to the balance sheet for the second quarter, but earnings totaled only \$268.8 million due to a loss of \$400,000 generated primarily by unregulated subsidiaries. "We have said that our diversified operations will be profitable for the first time this year," Brown said.

While most RBHCs will not divulge which unregulated operations contributed to their bottom lines, Nynex Corp. admitted in a press release that earnings were "slowed by investments that are important in achieving the company's long-range financial objectives — investments that are aimed at enhancing the company's ability to build out from the basic telephone network."

Ameritech cited its unregulated operations as a "positive factor." Spokesman Bill Hensley said this year they will contribute 10% of revenue and should be profitable as a whole for the year. □

PacTel resculpts strategy

continued from page 9

Thirty employees, mostly systems engineers who supported the full service, were recently laid off, Damianakes said, while new staff is being hired to support the new array of services.

Damianakes noted that customers have been hesitant to bring in third-party services on a full-time basis. "People like to have their own tools and maintain their systems themselves," she said.

"When PacTel comes in, there is a fear we've come to replace some of the in-house staff." But, she said, "part-time contracts will get our feet in the door to show customers how we can work together."

Doane Perry, a senior analyst

with Framingham, Mass.-based International Data Corp., said customers do not want to give continuous long-term control to an outside service.

"PacTel was running counter to the prevailing 'do it yourself' trend. Now they are trying to come a little toward enabling the customers to do the monitoring themselves," he said.

Damianakes also said PacTel is "looking at" licensing its network management software because some 60 large organizations have expressed interest in it, but there are no immediate plans.

PacTel may also target vertical markets, Damianakes said, such as banking and education.

PacTel now services about 1,300 client locations in 38 states and has links to Canada and Puerto Rico, according to Damianakes. □

TELECOM TRENDS

► FINANCIAL NETWORKS

Fidelity tests new global messaging

Equinet system simplifies transactions.

BY JIM BROWN
New Products Editor

BOSTON — Fidelity Investments, a major money-management and investment company based here, is meeting with success in its beta test of a global electronic messaging system that trims the time and manpower needed to complete international bond and equity transactions.

Much of the success is due to the fact that Financial Telecommunications, Inc.'s (FITEL) Equinet network is also being beta tested by some of Fidelity's largest trading partners, including New York-based Salomon Brothers, Inc., a large brokerage house, and Wells Fargo Investment Advisors, the in-

vestment arm of Wells Fargo & Co. of San Francisco.

FITEL's Equinet links brokers, investors and financial institutions to a central computer in London over General Electric Information Services Co.'s (GEISCO) Mark III network. The service allows users to compare their copies of an investor's transaction order to the original for accuracy and completeness.

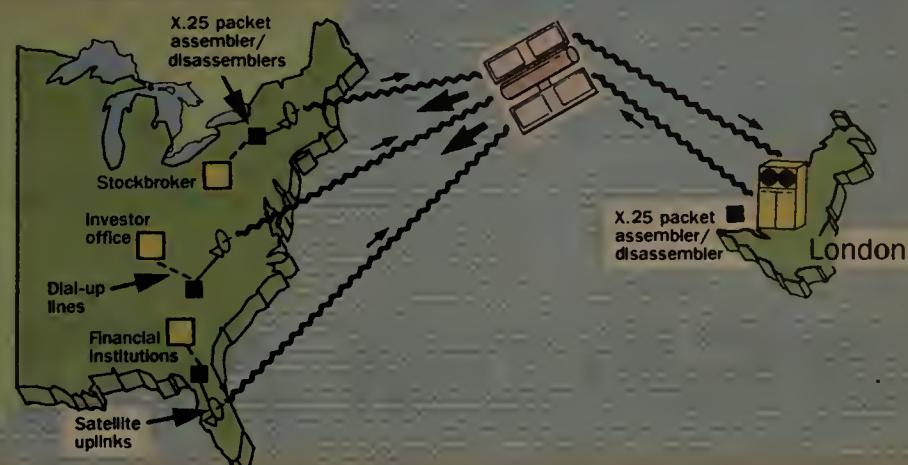
FITEL officials claim four out of 10 international bond and equity transactions go awry because of disagreements over information on transaction orders. According to George Sullivan, Fidelity's vice-president of mutual funds operations, some of Fidelity's international transactions have been in

Centel wins voice net contract

Centel Business Systems has won a \$7.4 million contract to provide Sheppard Air Force Base in Wichita Falls, Texas, with a voice communications system anchored by a Northern Telecom, Inc. Meridian SL-1XT private branch exchange that will support 5,475 lines. The net will replace several thousand Centrex lines.

As part of the networking project, Centel will install some 33 miles of twisted-pair wire to link all buildings on the base to the PBX. Centel will also provide a basewide teleconferencing system, using equipment built by Tellabs, Inc., and a personal computer-based call accounting system.

Financial Telecommunications, Inc.'s Equinet electronic communications network



End users equipped with IBM Personal Computer ATs or compatibles send asynchronous data over dial-up lines to packet assembler/disassemblers on General Electric Information Services Co. Mark III network. The data is then sent via satellite to Financial Telecommunications' Tandem Computer, Inc. Non-Stop computers located in London. These computers can transmit data back to the end user via satellite. Large users can have X.25 PADs located on their premises.

SOURCE: FINANCIAL TELECOMMUNICATIONS, INC., NEW YORK

limbo for as long as 14 months because of such disagreements.

Currently, Fidelity has a staff of 11 people who process \$75 billion in domestic trading transactions each year. But the company needs a staff nearly as large, eight peo-

ple, to process only \$7 billion in yearly international trading, according to Sullivan.

"The reason for the difference in numbers is because there are so many mistakes to be handled in the

See page 12

CROSS TALK BOB WALLACE

U.S. users look to UK "liberalization"

Large U.S.-based companies with network locations in the UK will get some additional communications options through two new transatlantic fiber-optic cables expected to be operational in the next two years — that is, if the U.S. and UK can reach an agreement on how these underwater transmission facilities will be used.

The two countries are working to hammer out an accord that would allow users to share, and vendors and users to resell private-line services offered over satellite and transatlantic links. Those practices are currently frowned upon by the UK, and delay in resolving the issues could set back implementation of the fiber cables.

The International Communications Association (ICA) has waded into the debate. Brian Moir, general counsel for ICA, recently sent a letter to the U.S. State Department and the National Telecommunications and Information Association calling for the liberalization of communications between the U.S. and

the UK.

It's not clear how many ICA members are actually interested in sharing private-line services. But, according to Moir, many large users that do not have enough network traffic to justify dedicated facilities between the U.S. and the UK are considering sharing private-line service.

Dave Edison, director of corporate information and communications for Westinghouse Corp. in Pittsburgh, an ICA member company, explained that although the UK is more responsive than other European nations to the needs of foreign users, it may not budge on the issue.

"The UK frowns on resale of facilities," Edison said. "They allow us to operate private networks, but they have specifically asked us not to carry other people's traffic."

Although several undersea fiber cables are already in place, some users are looking to the implementation of the

See page 12

► NETWORK ALTERNATIVES

FCC considers mobile satellite service plan

WASHINGTON, D.C. — An eight-company consortium has asked the Federal Communications Commission for permission to build a \$300 million mobile satellite services (MSS) system that will support communications between land, sea and air vehicles and their home offices throughout North America.

The MSS system will be particularly useful in providing mobile communications to rural and remote areas, allowing communications with locations not served by local and long-distance carriers.

In addition to its primary objective of providing mobile communications service to the U.S., the system will extend to Canada and Mexico.

Four of the eight members of the MSS consortium have agreed to become general partners, including Hughes Communications Mobile Satellite Services, Inc., a unit of GM Hughes Electronics; MCCA American Satellite Service Corp.; McCaw Space Technologies, Inc., a subsidiary of McCaw Companies, Inc.; and Skylink Corp.

The four other companies that have joined the consortium as limited partners are Global Land Mobile Satellite, Inc., Globesat Express, Mobile Satellite Services, Inc. and Satellite Mobile Telephone Co.

In its proposal to the FCC, the consortium outlined a plan to deploy two satellites, which will be built jointly by Hughes and Spar Aerospace of Canada.

The satellites will provide backup support

to each other.

A total of 12 companies filed applications with the FCC in 1985 to provide MSS. The current filing comes in response to an FCC order earlier this year that the 12 companies form a consortium and file a combined application.

One company withdrew, while three others remain undecided about joining.

Before beginning operations, the consortium must win an FCC license and a frequency allocation from the World Administrative Radio Conference, which is scheduled to meet in September. □

Fidelity tests global messaging

continued from page 11

international market," he said.

Equinet is designed to supplant the current practice of exchanging hard copies of transaction orders over telex facilities. Financial institutions have to compare copies of the order stored in each party's computer system, a cumbersome task frequently leading to mistakes that delay the movement of funds from buyer to seller.

Fidelity receives some 300 telexes a day, with data in a variety of formats, Sullivan said. Those telexes are checked against records residing in Fidelity's IBM System/38 minicomputer, which maintains orders in yet another format.

With Equinet, a broker enters completed orders on an IBM Personal Computer AT using a FITEL proprietary message format. A batch file is then loaded into Equinet's Tandem Computers, Inc. NonStop II host system in London over a 1,200 bit/sec or 2,400 bit/

kers, investors or financial institutions. If those other parties are linked to Equinet, they access and download the files to their on-site IBM Personal Computer AT. Equinet will also send a telex message to any party involved in the trade that is not linked to Equinet. FITEL charges between \$25 and \$30 per transaction to provide the Equinet service.

Equinet is designed to supplant the current practice of exchanging hard copies of transaction orders by telex.

sec asynchronous line provided by GEISCO.

Once a file is received, the Tandem system sorts it and readies output files destined for other bro-

kers, investors or financial institutions. Supporting 130M bytes of storage, the on-site Personal Computer AT stores Equinet files in a Cosmos, Inc. Revelation data base management system supplied by

FITEL. With that data base, the local user is able to prepare reports detailing which transactions have been confirmed as well as which have hit a snag.

Fidelity's Sullivan said he was pleased to learn that some key financial institutions were also testing the service. "The one pleasant surprise is that a couple of large companies had a lot of data on the system. We were willing to do this even if only 10 or 20 transactions a day were on it. But we found more than that on there," Sullivan said.

Equinet is designed to operate in much the same manner as a New York-based automated system that distributes electronic copies of domestic transaction orders to brokers, investors and financial institutions. That system was developed in the 1960s by Depository Trust Corp. (DTC), an affiliate of the National Securities Clearing Corp. (NSCC).

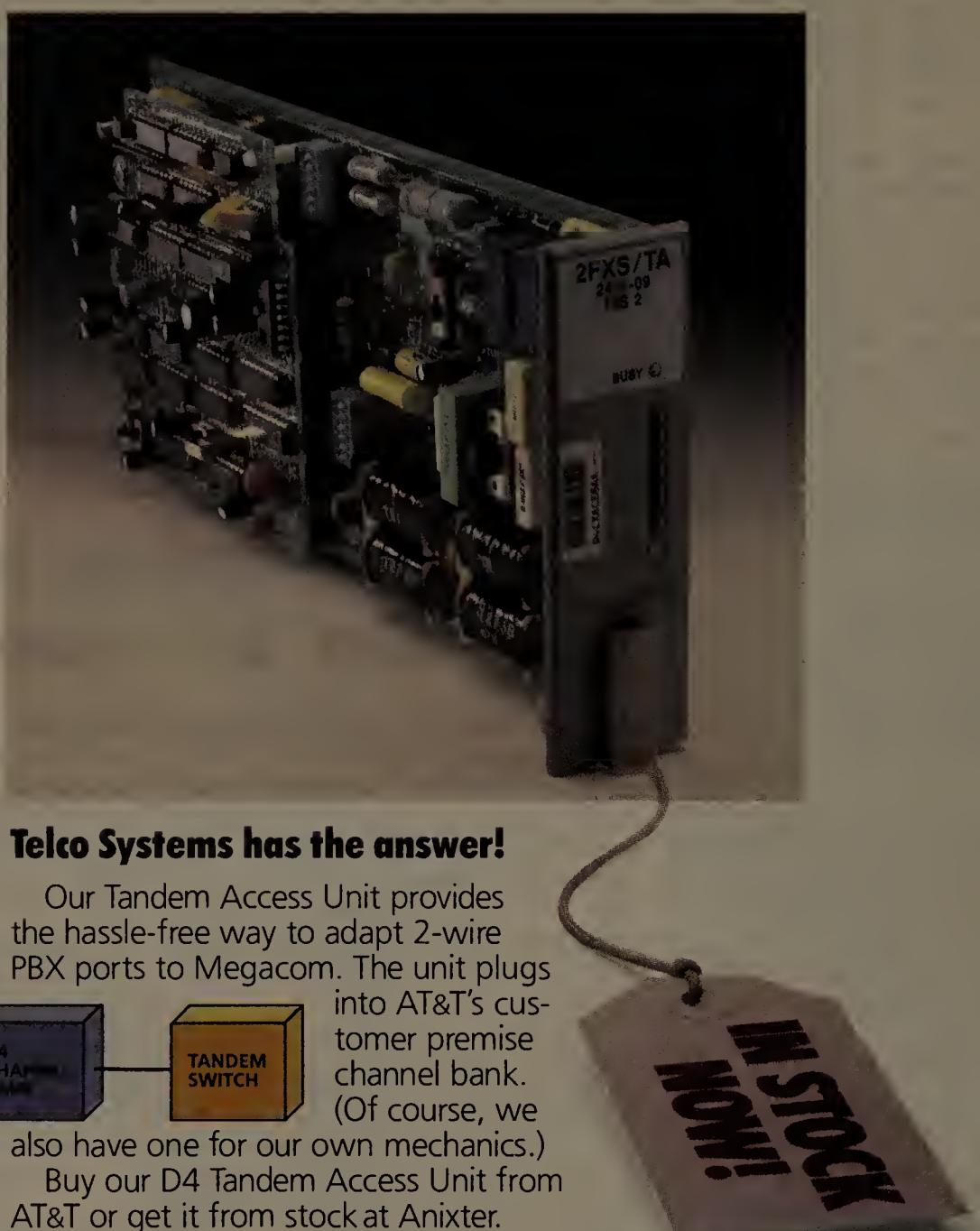
"If you've got efficient transactions, as you have in the domestic trading system, you need fewer people. And the people, in effect, manage the exceptions to the rule instead of all the routine work," said Sullivan.

FITEL will not be alone in this market. Reuters Holdings p.l.c. of London, which provides financial information services in addition to its news operations, recently acquired the Toronto-based Securities Clearing International Corp. and its Instant Link network. Currently being offered in Europe, Instant Link is a real-time system that keeps one central transaction order record and allows users to access and update it. NCSS also has plans to create an international version of its DTC.

"Whether it's FITEL or some other vendor, there has got to be a more efficient way to do this checking," Sullivan said. "In the U.S., just about everyone uses the DTC system and it works." That approach must now be extended to the international arena, he added.

When dealing with various cultures, it could be difficult to agree on a single system, Sullivan admitted. "But, the international market is big enough to support more than one of these types of systems." □

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U.S. users look to UK

continued from page 11

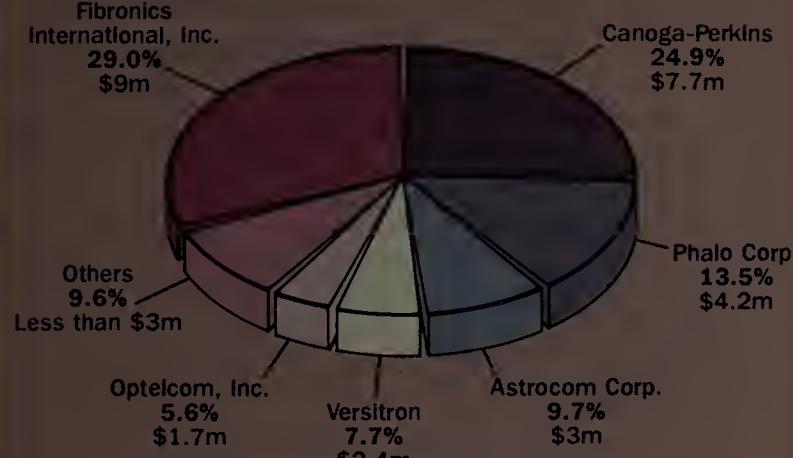
two new fiber cables, dubbed PTAT-1 and TAT-8, to provide network-route diversity. Many large companies are currently communicating with their UK locations via satellite and are eagerly awaiting the fiber links to provide redundancy in the event of a failure.

Dan Muecke, vice-president of the Bankers Trust Co. in London and an ICA officer, said the bank will likely acquire services on PTAT-1 and TAT-8. "Use of these cables would give us the advantage of diverse-path traffic routing," he said. The bank currently counts on international satellite services for most of the traffic between London and its U.S. headquarters in New York. □

DATA DELIVERY / NET MANAGEMENT

Worldwide fiber-optic time-division multiplexer shipments

Total = \$31m
Average unit value = \$2,764



NOTE: Others include Ericsson; Lightwave Communications, Inc.; M/A-Com, Inc.; Manage, Inc.; Matheson; and Racal-Milgo Corp.

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

► NETWORK MANAGEMENT, INC.

NMI in first net control alliance

BY PAUL KORZENIOWSKI

Senior Editor

BETHESDA, Md. — Venture capital-backed Network Management, Inc. (NMI) last month struck its first strategic alliance in the net management industry with an equity investment in Fairfax, Va.-based CRC Systems, Inc.

The agreement with CRC represents NMI's first step in its plan to forge an integrated network management line ("Firm poised for buyout binge," NW, Feb. 23). The agreement consists of an equity investment of both cash and stock in CRC, a privately held company. Both companies declined to discuss terms of the agreement, which is expected to be consummated this month.

Chuck Riviere, president of CRC, said "NMI adds the financial and management resources for us to continue our rapid growth." CRC provides network management consulting, software and facilities management services to government users. The company's clients include the Defense Communications Agency, Nuclear Regulatory Commission, Bureau of Labor Statistics, Department of Agriculture and the state of New Jersey.

CRC, which was founded in 1975, employs 400 workers and expects its year-end revenue to be \$18 million. In February, CRC landed a five-year consulting contract with the Defense Communications Agency for additions to the Defense Data Network.

With \$50 million in venture funding, NMI plans to purchase or form strategic alliances with companies that address various network management functions and meld the products into a coherent product line. NMI plans to offer products in six areas: inventory control, station message detail recording reports, network design, facilities management, network planning and real-time data diagnostics. NMI plans to address both the government and commercial markets.

NMI was founded by two ex-Contel Information Systems executives, Howard Frank, now chairman of NMI, and Michael Muntner, now president of NMI. Venture funding is being supplied by Alan Particof Associates, Bessemer Venture Partners, Oak Investment Partners, Orange Nassau, Matrix Partners, Battery Ventures, The Bain Capital Fund and Abacus Ventures.

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Modem guarantee

If a Fujitsu America, Inc. modem fails in its first year of operation, the company will repair the device and give the user a new modem free of charge. The offer applies to the company's L modem series, which operates at speeds of 2,400, 4.8K, 9.6K and 14.4K bit/sec.

► BIG BLUEPRINT

IBM preps DSU/CSU to work with NetView

BY PAUL KORZENIOWSKI

Senior Editor

Network World has learned that IBM plans to announce in the fourth quarter a new digital service unit/channel service unit (DSU/CSU) that works in conjunction with NetView, the company's host network management package.

Under nondisclosure agreements, IBM has recently been outlining its plans to a handful of customers on the verge of making large DSU/CSU purchases.

A DSU/CSU acts as an interface between customer premises equipment, such as a multiplexer, and digital data services, such as AT&T Communications, Inc.'s Dataphone Digital Service.

The new product is expected to feature a switch-selectable option so it can operate at speeds of 2,400, 4.8K, 9.6K, 19.2K or 56K bit/sec. The DSU/CSU is supposed to support both RS-232 and V.35 interfaces.

IBM is a relatively new player in the

DSU/CSU market, having announced its first offering in May of 1986. Datatel, Inc. is reportedly the OEM of the first product. IBM told one user that this second product is being developed by IBM's Communications Products Division in Raleigh, N.C.

Customers will be able to control and manage the new device through NetView, IBM's host network management system.

One manager who did not want to be identified said IBM's DSU/CSU would use a bit-robbing scheme so Systems Network Architecture diagnostic information could be packaged with other information on a digital line.

This technique for transmitting network management information is known as in-band signaling.

Large IBM shops may find the increased network management functions appealing. The manager, who had been briefed on the new product, said, "We are very interested in increasing the diagnostic capabilities

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DATA DIALOGUE

PAUL KORZENIOWSKI

The business of technology

To increase revenue and profits, large companies have begun moving in two important directions. A few companies are trying to transform substantial communications investments into business opportunities. Many other users are working to develop applications that will increase their companies' market shares.

A handful of large companies are now selling internally developed communications products to other users. In the past few years, Eastman Kodak Co. and Travelers Corp. began selling software originally developed for internal use.

Also, AMR, Inc., the holding company that owns American Airlines, has entered the telecommunications training business, and Texas Air Corp. plans to resell extra network capacity. ("Texas Air building gigantic SNA net," NW, Aug. 3)

These companies are trying to recoup some of the millions of dollars invested in their current networking systems. To their advantage, these nouveau vendors possess tools typically unavailable to a start-up company. For example, AMR is able to tap experienced American Airlines engineers to lecture for new courses.

The opportunity to gain a return on a network investment is inviting, but

it can require a substantial additional investment. Eastman Kodak has hired more than 50 employees for the independent business unit that sells its communications software.

Since these endeavors are relatively new, it is too early to determine whether they have what it takes to be a success. The expertise needed to sell communications products differs from the smarts required to develop them.

In addition to becoming vendors, corporations are developing so-called strategic applications to help them wrest market share from competitors. American Airlines and its Sabre travel reservation system is the best known example of a strategic application. By offering travel agents an on-line reservation network, the company was able to increase airline ticket sales.

Deregulation of various industries, sophisticated networking products and better communications software have enabled companies to conceive of applications that were not possible a few years ago. During the past six months, this reporter has talked with more than a dozen communications managers who say their companies are building strategic applications. The development activity is prevalent in the

See page 14

IBM preps DSU/CSU

continued from page 13

of our DSU/CSUs." He noted that these devices are typically quite dumb, making it difficult to pinpoint a line problem.

Traditionally, other vendors placed diagnostic information on a low-speed channel on a digital line, a technique known as sideband signaling.

AT&T recently announced a new service, secondary channel signaling, which uses sideband signaling in order to transmit network management information for its 56K bit/sec services.

Recently, a number of communications vendors announced products that

are compatible with AT&T's new scheme, and some analysts had speculated that IBM would also fall into step.

New services from carriers such as AT&T are one factor leading a DSU/CSU market surge, according to Richard Villars, a senior market analyst at International Data Corp., a Framingham, Mass., market research firm.

He said \$70 million worth of DSU/CSUs were shipped in 1986, a significant increase over 1985 sales of \$43 million. AT&T is the market leader with close to 50% of all shipments, followed by General DataComm, Inc., Teleprocessing Products, Inc. and Amdahl Corp.

"The market is dynamic," he said. "In the last year, we began to see ven-

dors try to differentiate their products."

IBM's new product should carry a sales price of \$700 to \$800, and shipments are expected to begin in the first quarter of next year.

When asked to comment on the upcoming announcement, an IBM spokesman said, "such product information is not accurate as far as I know." □

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In recent months, ads for networking software have all begun to sound alike. Each promises a unique solution to your networking problem (even before the vendor knows what that problem really is). Each tells you the product is easy to use (that is, of course, if everyone is thoroughly trained). And that when you buy the product, you'll get all the technical support you'll need (but they don't tell you how long you must wait to get it).

No wonder user skepticism grows daily!

Properly implemented, network communications software is an effective way of sharing data and peripherals among diverse computer systems. A skeptic, on the other hand, is one who seriously doubts that such a capability exists.

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WOLLONGONG



Introducing Network Communications Software For Skeptics.

Business of technology

continued from page 13

financial, manufacturing and travel services industries.

There are potential pitfalls with such applications, however, because they sometimes don't function as planned.

In the early 1980s, a Boston insurance company invested close to \$50 million to develop an on-line policy-processing system. I was working for the company at the time and watched the MIS department double in size yearly for three years. The added manpower, however, did not keep the development project from falling behind schedule.

When the company's revenue decreased, the department was dramatically cut. Half a dozen rounds of layoffs brought the MIS department back to its former employment level and left the company with a tarnished reputation. The company is still working on its policy-processing system.

The new era involves significant risks and rewards for communications managers. If they are part of a team that contributes to the corporate bottom line, their careers could receive a boost. However, their reputations may be tarnished if projects create business problems rather than solutions. □

NMI in first net alliance

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NMI is currently looking for either a service company that has a strong base in the marketplace or a product company. "There are plenty of candidates out there, but most are small companies with sales of \$5 million to \$8 million," Frank explained.

"We would rather purchase a medium-sized company, since it would already have a suitable management infrastructure." □

LOCAL NETWORKING

DISTRIBUTION STRATEGIES

Novell resellers view direct sales warily

BY PAULA MUSICH

Senior Editor

Novell, Inc.'s recently announced Major Accounts Division has brought an outcry of protests from some of its value-added resellers and raised concerns over Novell's ability to support Fortune 1,000 customers directly.

Protests over the new direct sales division and the way its representatives op-

erate have come mainly from East Coast value-added resellers, but resellers from around the country have questioned how effectively Novell can directly support large accounts.

The new division, made up of some 10 sales representatives and seven support people, was instituted to "give Fortune 1,000 customers the additional service and support they require," according to Ray Noorda, president and chief executive officer of Novell. Although the firm built up its business mainly through distributors and value-added resellers, it found it was not being properly represented by some of them.

"We formed the major accounts business fundamentally to make sure that the major accounts knew about Novell, about the extent of its products and how they work," explained Noorda. The new division was also chartered to share responsibility with resellers for developing corporate purchasing agreements for Fortune 1,000 customers that want direct contact with the networking vendor.

"[The division] is there for the resellers to take if they wish, and we will endorse them and qualify

them and say they're every bit as good as our own organization," Noorda said. "And if customers want something beyond what the resellers provide, we're there to help in that."

According to one value-added reseller who asked not to be named, some Novell direct sales people are helping by changing proposals developed by resellers to include more Novell products instead of third-party products that were originally specified.

"We did a proposal with them for a big insurance company, and we spent three days getting this together. Their people came to our office at the last minute and rewrote it to make it all Novell products," the value-added reseller said.

"Integrators offer as many of the Novell products as can really fit, but we look to put the best components together to guarantee success," he continued. "I've yet to have any any difficulties with products that didn't perform as expected because I've always had the liberty of selecting from multiple vendors to complement the system."

Not all Novell resellers are finding the same level

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NET NOTES

Networking vendor Bridge Communications, Inc. added to its family of local network bridge products an Ethernet bridge that links remote Ethernet local-area networks over point-to-point communications links.

Dubbed the IB/3, the bridge can support up to eight communications circuits of various types, including satellite and microwave links, switched lines, conventional leased lines and up to two T-1 lines. It is the company's first product offering T-1 support.

The IB/3 is priced at \$10,500.

Separately, Bridge announced a marketing and joint product development alliance with minicomputer vendor Data General Corp. Under the agreement, the companies will coordinate their marketing and promotional activities and develop local-area network products based on the Open Systems Interconnect architecture.

Corvus Systems, Inc. upgraded its networking software for Apple II personal computers used in school classrooms. The package, dubbed Constellation III, enables any type of Apple II to be used on a Corvus Omnitel local-area net.

The software is designed specifically for educational

See Net notes page 16

"It's true that you can't say how much twisted-pair wire existing in walls today is usable for running Ethernet data signals, but there is more than coaxial or IBM Cabling System wire."

Andrew Ludwig

President

SynOptics Communications, Inc.

LANMARKS

ERIC H. KILLORIN

3Com/Bridge pact signals market consolidation

The recent announcement concerning Bridge Communications, Inc.'s and 3Com Corp.'s intention to merge shouldn't come as any surprise. This action exemplifies what the management textbooks have espoused for years: Maturing markets pave the way for a consolidation of the players.

For the local network business, this means fewer and fewer companies will be selling network systems. But those that remain will be stronger and thus more able to survive the vagaries of the ever-changing marketplace. More importantly, users' needs will be better served since the smoke churned by the vendors' public relations people will dissipate as their numbers diminish.

The Bridge/3Com alliance makes sense. It's a blend of the local network business' most fundamental principles — the box-oriented approach of Bridge's product line with 3Com's total network systems sales pitch and end-user distribution.

Think back to 1985 when Micom Systems, Inc. announced its plans to acquire Interlan, Inc. Here we had the preeminent data-switching vendor, with scores of black boxes to tie together the low-speed communications lines of corporate America, teaming up with Interlan, the purveyor of Ethernet-based local nets that tie together CPUs and terminals. The alliance offered Micom the needed complement to its switching business and a ready market entry for high-speed networks.

For Interlan, the alliance offered access to a large installed base of customers and a large group of terminals ready to be networked. The Micom/Interlan deal has not positioned the combined enterprise in the top three local net providers, but one might have expected less satisfactory results had the two companies remained separate entities.

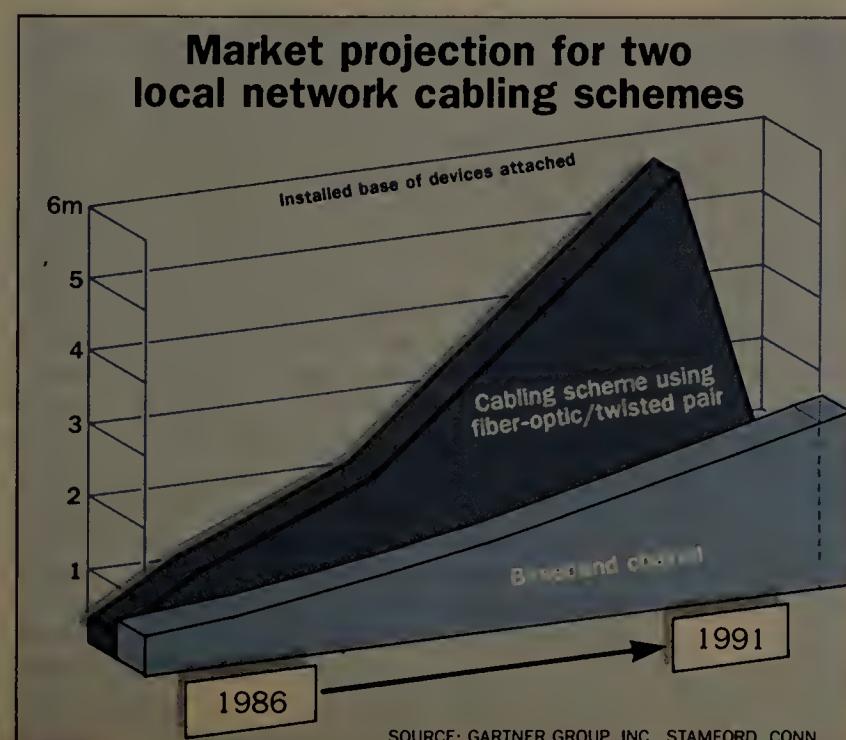
In the case of Bridge and 3Com, there is an agreement out of necessity. Not because of current conditions in the marketplace but because of the future. Bridge's president, William Carrico, hit the nail on the head when he said, "We felt there was some consolidation that would be inevitable, and we wanted to pick our partners instead of having someone else pick them for us." In an era of unfriendly takeovers, mergers and acquisitions, an alliance developed as a preemptive strike is perhaps the best form of preventive maintenance. It's certainly the best tactic for survival.

What is equally interesting in this proposed merger are the roles of Novell, Inc., Ungermann-Bass, Inc., Sytek, Inc. and numerous other independent local network suppliers. It may be that even Ungermann-Bass, the company by which all other independent network vendors are measured, will play second fiddle to the Bridge/3Com enterprise.

This merger pushes Sytek onto even shakier ground, for now 3Com has access to Bridge's product line for broadband components. 3Com's new partner and its alliance with Microsoft Corp. to re-

See page 16

Eric H. Killorin is the publisher of "Netline," an industry newsletter on computer networks, a publication of Hyatt Research Corp. in Andover, Mass.



3Com/Bridge pact signals

continued from page 15

sell the LAN Manager have also given Novell's executives a few restless nights' sleep.

True, Novell's NetWare is a superior operating system for IBM Personal Computer network environments when compared with what is now available from IBM or Microsoft. But what will matter in the next two years are the applications written to the most promising network implementation, and there is a compelling argument that Novell has lost some momentum as a result of the events of the past six weeks.

If IBM endorses Microsoft's LAN Manager, NetWare's future will be in jeopardy and Novell's only recourse will be to retrofit NetWare to appeal to new users.

As merger mania takes hold of the local network marketplace, expect more deals and possibly additional alliances from the Bridge/3Com base. Imagine this duo evolving as a consortium of network systems talent: the token-ring expertise of Proteon, Inc., the untold software talent of Microsoft and the runaway workstation successes of Sun Microsystems, Inc.

That would virtually sew up the lower and middle tier of the market. Now, that's one for the textbooks. □

Novell resellers view direct sales

continued from page 15

of pressure to sell more Novell products, however. "I get calls from Novell all the time trying to ensure that I'm selling as many Novell products as possible, but I've never gotten any undue pressure toward that end, and I always propose what is best for the customer, not Novell," said Dennis Passavoy, president of DataLAN, Inc., a Novell reseller organization in Canoga Park, Calif.

How much latitude Novell is willing to give the value-added resellers in selling third-party products is unclear. According to Noorda, "Our major accounts people are fundamentally there to establish a platform on which other people can sell as well. But for the long term, if customers run into problems or if they need something extended beyond what a typical reseller will sell, we want to make sure the Major Accounts [Division] knows of all the products that are available, either directly from us or from other people."

Some resellers, however, questioned how well Novell's direct sales and support people know the products that are available from Novell, let alone from other sources.

"When you walk into a Fortune 500 account, you have a broad range of dissimilar equipment that

the firm wants to tie together into some sort of interoperable environment," explained Guy Hoffman, an account executive from reseller company Access Data Products, Inc. in New York. "This means that the company serving that firm has to be aware of the various bridging, gateway and emulation technologies that are out there to facilitate this. Clearly, the personnel that we've encountered from Novell are not really that familiar above and beyond their product line. And even within their product line, getting an answer out of Novell to a specific question is nearly impossible."

Other resellers also questioned the level of knowledge Novell people have of their firm's products. "I don't think they can support direct sales," said the unnamed reseller. "The people don't know the products yet. I think it'll take six to nine months to get them up to par on the products."

Although the Major Accounts Division was chartered to work with Novell resellers, some of them fear that they have lost leads to direct salespeople who have underbid the resellers. One East Coast value-added reseller, who preferred not to be identified, lost at least one account to Novell direct sales people when they offered greater discounts. "Every one of my customers has received solicitations from Novell for support, hardware and software," said the reseller. "Novell is saying to the corporations, 'If you get training, you can become an internal distributor of Novell products.' So they send one guy to training for three days, sign him up on the Novell

support contract, and then they buy directly from Novell. There's no way we can compete. They're offering 30% to 35% discounts, and in some cases, more."

There are trade-offs in taking advantage of the deeper discounts Novell direct sales representatives can offer, however. One of the reseller's customers that considered Novell's offer questioned the adequacy of the three days of training. "The only reason I'm still involved with the customer is that he's not sure that three days is actually going to be adequate for him. I don't think it's adequate at all," the reseller said.

Other value-added resellers have avoided working with the direct sales organization because they fear that turning over required information on their accounts will lead to losing customers. "The way they structured the compensation plan for the major account reps is that they must have specific purchase orders and financial information on business we're doing with our customers," explained the unnamed reseller. "A lot of people are saying, 'I don't want to give this to them and have them negotiating behind my back.'"

Despite his complaints about the Major Accounts Division, one of the value-added resellers feels that if the division is implemented as intended, it will accomplish much for end users and resellers. "I'd like to see the major account program do what they want to do: maintain Novell's presence in the field and make sure Novell is getting properly represented," he said. "I think that's an excellent idea. I like the essence of it, but the implementation of the program has caused rumblings in the field." □

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Net notes from page 15

environments where teachers do not have much time to set up or manage computer systems. New features offered by Constellation III include simplified, pop-up menus and a batch processing mode to set up network accounts and volumes for a class in a short time. A new optional companion program, MenuMaker, allows teachers to create custom menus without programming.

The new package supports the ProDOS, DOS 3.3 and University of California, San Diego Pascal operating systems. Combined with other Corvus software, Constellation III runs CP/M, MS-DOS and Macintosh programs on the network.

A dedicated 128K-byte Apple IIe is required to run the software, as well as 48K bytes of memory in each Apple II on the network. Up to 63 workstations and up to 10 network hard disk drives can be supported. The program carries a list price of \$495.

Corvus also unveiled a new support service for users of the network operating system PC-NOS and for users of Constellation III. The new service, available free for the first year, provides telephone support, automatic software updates and a quarterly newsletter.

After the first year, the service will cost \$199 per year.

Eicon Technology Corp. and Waterloo Microsystems, Inc. signed an OEM agreement that will provide users of Waterloo's Port networking software with a series of communications capabilities.

Eicon will provide Waterloo with products supporting X.25 packet switching, X.400 message handling, and IBM 3270, 5250 and Advanced Program-to-Program Communications (LU 6.2).

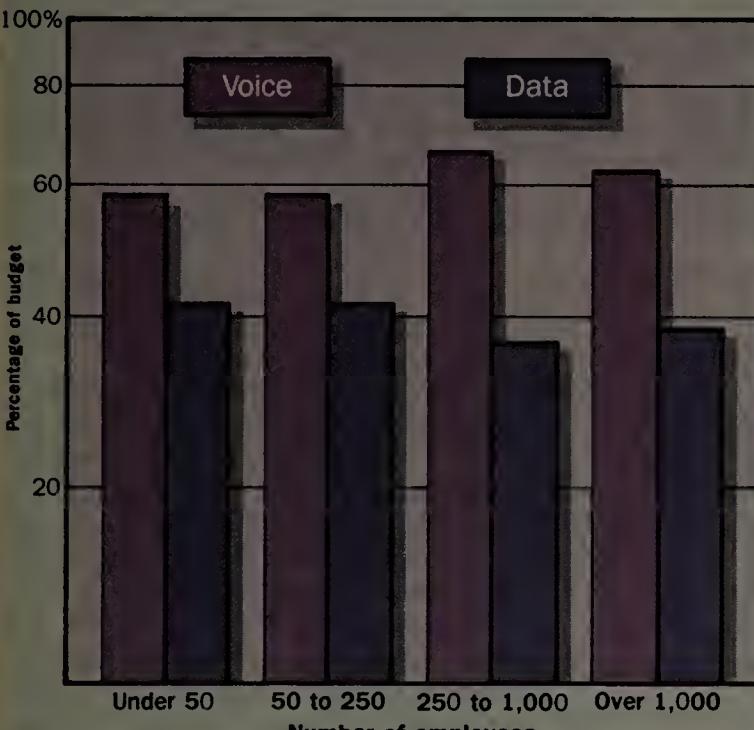
Waterloo will begin shipping the products in the third quarter.

NEC Information Systems, Inc. announced a network file server for use in IEEE 802.3 Ethernet local-area networks. The company said the new NEC 1900 is designed for use with its own NEC 1500 workstations but will work with non-NEC devices as well.

The NEC 1900 provides 4M bytes of memory (expandable to 32M bytes), AT&T's Unix operating system and three RS-232-C ports. The file server runs under either of two network protocols, Transmission Control Protocol/Internet Protocol or Network File System. Prices for the NEC 1900 start at \$54,000. □

COMMUNICATIONS MANAGER

Comparison of voice and data budgets in all U.S. industries



SOURCE: THE MARKET INFORMATION CENTER, INC., MARLBOROUGH, MASS.

COST CUTTING

Vigilant users on the lookout for bill errors

Wary customers save money, win big refunds.

BY MICHAEL FAHEY
Senior Writer

OVERLAND PARK, Kan. — Billing errors by local and long-haul telecommunications companies cost users huge sums every year for nonexistent services and equipment. Vigilant users, however, can put an end to billing mistakes and, in some cases, garner hefty refunds from the carriers, according to Bruce Thatcher, president of TelCon Associates, Inc., a telecommunications consulting company here.

Conducting a regular inventory of equipment and services is a reasonably

simple, yet important means of controlling service and equipment costs. "You can save money just by checking for discrepancies between what you are billed for and what you are getting," Thatcher said.

He noted that one of his clients, a Houston trucking company, received long-distance service from MCI Communications Corp., which contracted with Southwestern Bell Telephone Co. for local access. When the trucking outfit discontinued its MCI service, it continued to be billed by Southwestern Bell for four unused trunks. "The trunks were just hanging there, but

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GUIDELINES MICHAEL FAHEY

Finding the business vs. technology balance

The growing recognition that communications and information technology can be put to competitive advantage has sent many communications managers in search of business skills.

The more farsighted communications professionals realize they cannot concern themselves with technology for its own sake. New services and hardware are important only insofar as they actually serve the end users and advance the organization's business goals.

The current emphasis on acquiring general business skills, however, should not come at the expense of honing technical skills and staying abreast of the developments in communications services and hardware.

Communications managers whose base of knowledge is primarily telecommunications must become familiar with data systems. Conversely, those whose background is data processing must understand telecommunications issues.

"There has to be a balance between business and technical issues," said Lionel Gillerman, president of the Tele-Communications Association and manager of network technology at McDonnell Douglas Aerospace

Information Services Co. in Cypress, Calif. "The business aspect is very important, but you've got to understand the technical issues so your staff and vendors can't snow you."

Leonard Kleinrock, president of Technology Transfer Institute, a Santa Monica, Calif., consulting company, and professor of computer science at the University of California, Los Angeles, said that technical knowledge remains a primary requisite for communications and information systems managers.

He noted, in fact, that the general MBA degree is declining in popularity, and many colleges and universities are offering MBAs with a concentration in other disciplines, such as telecommunications and computer science.

All of this is not to downplay the importance of understanding wider business issues. Nor is it a call to return to the days when communications managers were considered merely technicians. The increasing complexity of communications technology requires that managers continue to follow developments in that area, while they increase their skills in business fields. □

What do you see as the pros and cons of using a systems integrator to put together multivendor communications systems as opposed to doing it yourself?

"I just resigned my position because I tried to be a systems integrator myself, and it doesn't seem to work very well. But I think that's because of the college environment I was in. A person who tries to combine communications systems from multiple vendors has a complicated job. If you think that people from the outside would try to hire a person to integrate systems for them, I think colleges feel suspicious about doing that. I think private organizations feel that way, too, but I may be wrong. The pro side is that the outside person may have a better rounded view of the industry than the people you have in your own organization. The con is that the people in your organization will pay no attention to the outside person."

Charles Moses
Systems analyst
Kiewit Computer Center
Hanover, N.H.

Formerly Kiewit's network systems programmer for Dartmouth College

"It depends on what level of expertise you have in your shop. In some shops, the level of expertise would be enough to do it in-house, but in other cases, you have to bring people in from outside."

"If the systems integrator comes in, helps you make your decision and explains the various implications and choices, you understand the situation more clearly. You see

Jim Ray
Senior staff consultant
Cycare Systems, Inc.
Dubuque, Iowa

"Users would probably want to put these packages together themselves. The primary reason is because if you're looking to an outside source to be an integrator, they, first of all, have to understand your system. Depending on the size of the system and the complexity of it, you're looking at a period of time in which the person learns what you've got and where you want to go. So, you're looking at quite a bit of time. Whereas, the user should already understand the telecommunications network, how it operates and where the user wants to go with it."

Alton K. Smith
Communications analyst
Dallas Corp.
Farmer's Branch, Texas

"It would be easier on the staff to let the local party integrate. And it would be even more helpful if the party that was supplying the major data communications equipment would be able to do it. That's the case with us. We're utilizing Unisys [Corp.]-type hardware and their front-end equipment is able to bridge the gap to SNA and X.25."

David Barton
Senior analyst
Dallas Independent School District
Garland, Texas

"When evaluating responses to requests for proposal, assume that they will not conform to specifications. That way, on occasion, you will be pleasantly surprised."

Ian Angus
President
Angus Telemanagement Group, Inc.
Toronto

Vigilant users on the lookout

continued from page 17

the customer was being billed for them each month," Thatcher said. "We find variations of that particular problem all the time."

"This is quite common on private-line networks going great distances," he said. "When you put in a new computer system, for example, you may change the conditioning on some lines. What happens is the carrier puts in the new lines but forgets to take out the old ones." He cited the case of a client who was paying thousands of dollars every month for unused circuits running between Dallas and Kansas City, Mo.

These billing errors escape the notice of the uninitiated because telephone companies bundle many services together on customer bills under the monthly service charge heading, Thatcher said.

International private lines are often the source of billing problems, he continued. Unlike domestic private-line arrangements, which allow the user to designate one carrier — usually AT&T — to handle hooking up, billing for and closing circuits, users with international private lines must deal with the originating carrier for all billing issues.

Thatcher said he had a client in Niagara Falls, Ontario, with a foreign exchange line bearing a New Jersey telephone number. When

the client's New Jersey location closed, New Jersey Bell and AT&T were notified that the foreign exchange service was no longer needed, and service was discontinued. However, because Bell Canada was the originating carrier and was not notified of the circuit termination, the company continued to be billed for the existing circuit, which was bundled in with its monthly Bell Canada bill.

"With private lines, you may get three different bills for a circuit, but you cannot terminate that service unless you notify the controlling office," Thatcher said. He recalled a case involving a client whose circuits ran from Hammond, Ind., to Chicago. The circuits were billed by Illinois Bell, but since the

originating office was in Indiana, Illinois Bell would not terminate the service.

Having notified Illinois Bell of its intention to discontinue the circuits, the customer felt it was no longer responsible for the circuits. However, Indiana Bell continued to bill the customer, which ultimately received a \$27,000 refund when the matter was ironed out, according to Thatcher.

As AT&T builds more long-distance points of presence throughout the country, the vertical and horizontal coordinates that are used to gauge the distance between user sites and AT&T points of presence have changed. "For a lot of private-line networks, your V and H coordinates are changing," Thatcher said. "The distances are not as great in many cases, but the bills never change unless you do something about them."

Many telecommunications managers in large organizations pay much more attention to long-distance bills than they do to local telephone bills, Thatcher said. But there are also savings to be had by devoting closer attention to local telephone bills.

In many states, users can choose whether they want to be billed a flat rate for each call or for each

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4. The contest is open to residents of the continental U.S. and Canada, 18 years of age and older, except employees of International Data Group, its agents, affiliates and subsidiaries. This offer is void where prohibited, and subject to all federal, state and local laws.

5. For a list of winners, enclose a stamped, self-addressed envelope with your entry form.

Contest sponsored by Communication Networks.

minute of calling time. The advantages of each billing method vary depending upon which telephone company offers the service. Thatcher pointed out that a company with hundreds of locations across the country could be unnecessarily spending thousands of dollars on local calls each month because it chose the least beneficial method of billing.

"That could mean the price of adding staff to the telecommunications department," he said. "Telecommunications managers have to prioritize their tasks. But some of these seemingly small savings can add up."

He warned users to be especially vigilant in checking for billing errors when they install a new telephone system. "Typically, when you install a new system, you make the equipment supplier an agent so they can handle all the ordering," he said. "Often, they order the old stuff out and put their stuff in. But, very frequently, they do not follow up on the bill after they have installed their stuff. After all, they have made their sale."

This situation is aggravated by a rule imposed by some telephone companies, Thatcher said. The telephone companies allow a vendor to place orders but will not allow the vendor to have access to its itemized billing records without a letter from the customer declaring the vendor its agent. □

NEW PRODUCTS AND SERVICES

► SOFTWARE AG

Operations tool eases net control

Software supports session management.

BY JIM BROWN

New Products Editor

RESTON, Va. — Software AG of North America, Inc. is expected this week to release software that will enable network operations personnel to log on to multiple VTAM applications and perform session management tasks, including network response-time monitoring.

Running as a VTAM application on IBM mainframes, Net-Pass software enables a 3270-type terminal to access concurrently such VTAM applications as IBM's TSO, CICS and IMS/DC as well as Software AG's teleprocessing monitor Complete. Working under IBM's MVS/XA, MVS, VS1, DOS and DOS/SP2 operating systems, the menu-driven Net-Pass also includes a Transmission Optimizer feature, which improves response time to remote terminals.

That feature can be used to reduce the amount of traffic carried over the network to remote sites, thus hastening the delivery of data being updated on the remote screen. The package will limit network traffic by examining data currently being displayed on the remote-terminal screen to deter-

mine what data the remote-terminal operator is updating. The package will then transmit only the data needed to reflect that update.

This traffic-reduction feature can be configured to examine each field of data or each character on the remote screen. Previously, the contents of the entire screen had to be transmitted each time a change was made.

The menu-driven Net-Pass also includes a Transmission Optimizer feature, which improves response time to remote terminals.

The product's Response Time Monitor feature keeps transaction and response-time records for each user. This feature tracks the number of transactions submitted, the average response time for those transactions and the maximum response time encountered. It will also provide the percentage of transactions falling within each of three time frames and the percentage of transactions exceeding user-defined limits.

Net-Pass is capable of displaying up to 10 VTAM sessions in windows on a 3270 terminal screen.

Each of the displayed sessions can be active, and a single command can be used to log off all the active sessions.

In addition to session management functions, Net-Pass is able to receive broadcast messages from anyone on the system. Net-Pass users are also able to broadcast messages from within one application to users of other applications.

The package enables users to route the contents of one window to another window or to a printer supported by VTAM. It supports such mainframe security software as IBM's Resource Access Control Facility and Computer Associates, Inc.'s Top Secret.

The product preserves mainframe CPU resources by limiting the number of times operations managers have to log on and off various applications. According to Software AG, Net-Pass is positioned as an alternative to more expensive terminal equipment, hardware modifications or application changes needed to perform the same functions.

The Net-Pass software ranges in price from \$15,000 to \$25,000, depending on the mainframe operating system. The firm said it will discount the purchase price by 20% for all orders received before Nov. 9.

The purchase price includes a one-year maintenance agreement. Subsequent one-year maintenance contracts can be renewed for 15% of the package's list price.

Software AG is located at 11800 Sunrise Valley Drive, Reston, Va. 22091, or call (703) 860-5050. □

See inside for:

Ethernet radio link

Hyperaccess enhancement

TrailBlazer modem

► CROSSCOM CORP.

Ethernet, StarLAN linked

BY JIM BROWN

New Products Editor

WEST BOYLSTON, Mass. — CrossComm Corp. recently released a stand-alone unit that provides a connection between Ethernet and AT&T StarLAN local-area networks.

The 487-ES utilizes the same hardware design as the firm's 487-EE Ethernet-to-Ethernet bridge. Using a proprietary software algorithm, the unit converts data packets from one network format to the other. It also retimes transmission of the data packets to comply with either Ethernet's 10M bit/sec speed or StarLAN's speed of 1M bit/sec.

The unit supports media access control software, which complies with Layers 1 and 2 of the seven-layer International Standards Organization's Open Systems Interconnect model. It is capable of transmitting data packets from an Ethernet network to a StarLAN network at speeds of 1,500 packets per second, which is said to be the maximum number of packets a StarLAN can generate.

The 487-ES directly interfaces to an Ethernet net and a StarLAN net, becoming a node on both networks. Users can modify the unit's preconfigured software to support special network addressing schemes. Additionally, users can download network management information to the unit from a host on the network or configure the unit to support data encryption.

The device is based on an Intel Corp. 80186 microprocessor. The input on both the Ethernet and StarLAN sides of the unit is capable of holding up to 8K bytes in a buffer until the data can be sent across the link. The unit examines all network traffic and matches it against internal routing tables to decide which data packets remain local and which are to be converted and transmitted to the other network.

The firm is considering developing a bridge to connect separate StarLAN networks, a spokesman said. It is also considering development of an Ethernet-to-Token Ring connection.

The 487-ES is priced at \$4,900.

CrossComm Corp. can be reached by writing to P.O. Box 403, West Boylston, Mass. 01583, or by calling (617) 835-4226. □

► HAYES MICROCOMPUTER PRODUCTS

Synchronous link needs no adapter

BY PAULA MUSICH

Senior Editor

TALLAHASSEE, Fla. — CQ Computer Communications, Inc. recently announced 3270 terminal-emulation software that works in conjunction with Hayes Microcomputer Products, Inc. modems to support a synchronous microcomputer-to-mainframe link without a synchronous adapter board.

The CQ 3270-R program is said to be the first product based on the new Hayes Synchronous Interface and Hayes Synchronous Driver, announced earlier this summer.

The CQ 3270-R software eliminates the Synchronous Data Link Control or Binary Synchronous

Communications adapter board normally required in microcomputer-to-mainframe links by enabling the personal computer to utilize the AutoSync capability in Hayes modems.

AutoSync operates with Hayes Smartmodem 2400, 2400B and new V-Series modems. It allows the modems to place calls asynchronously and then automatically switch to synchronous communications when the connection is made.

CQ Computer Communications also developed a version of the program that supports modem maker Racal-Vadic, Inc.'s Synchronous Auto Dial Language. According to CQ, the average cost of an SDLC board and software is \$895.

Both of CQ's programs make personal computers appear to IBM mainframes as IBM 3278, 3178 or 3194 terminals. They also support up to eight concurrent host sessions, color terminal emulation, context-sensitive help screens, 132 column-wide screens, IBM-compatible file transfer and mainframe-controlled windows.

The CQ 3270-R version supporting the Hayes AutoSync capability is available now and is priced between \$395 and \$995, depending on such optional features as multiple sessions and file transfer.

CQ Computer Communications is located at 5280 Capital Circle N.W., Tallahassee, Fla. 32303, or call (904) 562-4255. □

First Look

■ Radio links Ethernets over 10 miles

International Microwave Corp. introduced a solid state 23-GHz radio capable of transmitting 10M bit/sec Ethernet baseband data signals for distances up to 10 miles.

The IMC 2123 LAN will link Ethernet local-area network segments in campus-type environments. The link is said to be compatible with the IEEE 802.3 Ethernet standard. It will interface with Ethernet bridges and transceivers to provide two-way full-duplex communications. The radio features a radio frequency enclosure that can be mounted directly on a 24- or 48-in. antenna.

Pricing

The IMC 2123 LAN system costs approximately \$50,000.

International Microwave Corp., 65 Commerce Road, Stamford, Conn. 06902, or call (203) 323-5599.

■ Hilgraeve enhances its Hyperaccess software

Hilgraeve, Inc. enhanced its Hyperaccess software to enable IBM Personal Computers and Personal System/2s to emulate Digital Equipment Corp.'s VT-220 terminal.

Version 3.22 supports ASCII, multinational, graphics, British, French-Canadian and German character sets, alternate keypad modes, seven- and eight-bit operation modes, autoprint mode and printer-controller mode, as well as print-cursor line mode and print-screen mode.

The software is said to support transmission at 57.6K bit/sec, which exceeds the VT-220 maximum speed of 19.2K bit/sec.

In addition, the software enables the Personal Computer to emulate other terminals including teletypewriter terminals; DEC's VT-52 and VT-100; IBM's 3101 and 3278; Televideo Systems, Inc.'s 925, 950 and 955; and Wang Laboratories, Inc. 2110-VS.

Version 3.22 costs \$149. Registered owners may upgrade for \$30.

Hilgraeve, Inc., P.O. Box 941, Monroe, Mich. 48161, or call (313) 243-0576.

■ TrailBlazer modem supports Kermit, UUCP at 14K bit/sec

Telebit Corp. enhanced its TrailBlazer modem to support Kermit and the Unix-to-Unix system copy protocol (UUCP) communications protocols at speeds up to 14K bit/sec over dial-up lines.

Previously, TrailBlazer modems supported Kermit, UUCP, Xmodem and Ymodem communications protocols at a maximum speed of 3K bit/sec. The TrailBlazer's maximum speed is 18K bit/sec. Kermit is supported across a range of computer types, while UUCP is a utili-

ty under the Unix operating system. Xmodem and Ymodem are public domain protocols for personal computer-to-personal computer communications.

In addition to supporting these protocols at high speed, Telebit's new software supports Microcom, Inc.'s Microcom Networking Protocol error-correcting scheme at speeds up to 2,400 bit/sec.

The software enhancement will be a standard feature on new TrailBlazers, which are priced at \$1,345 for a stand-alone version and \$1,195 for a personal computer card version. Current users of the modem can get a new programmable read-only memory (PROM) chip and new software for \$124, with a \$25 rebate for sending in the old

PROM chip and warranty card.

Telebit Corp., 10440 Bubb Road, Cupertino, Calif. 95014, or call (408) 996-8000.

■ Statistical multiplexer supports up to eight ports

Dowty Information Systems unveiled a statistical multiplexer that transmits up to eight asynchronous channels over a point-to-point synchronous link operating at speeds up to 9.6K bit/sec.

The four-channel DISMX-2004 and the eight-channel DISMX-2008 support RS-232 or V.24 interfaces. To configure the unit, an operator accesses menu-driven software from a separate command terminal

and defines the devices attached to each channel.

The products feature such diagnostics as channel tests and local and remote loop-back. They also feature cyclic redundancy check error checking and come with a 16K-byte random-access memory buffer.

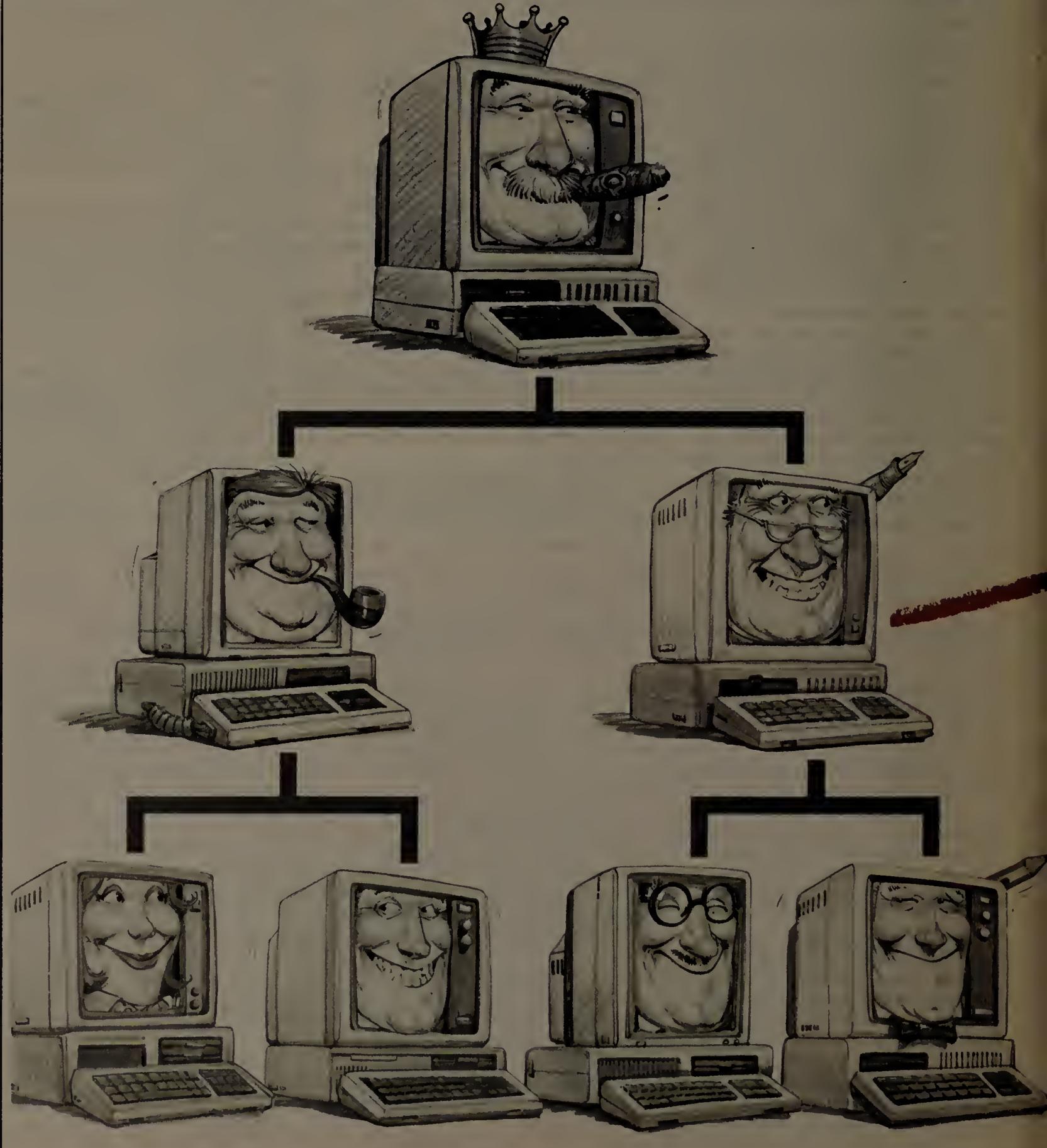
The DISMX-2004 costs \$895. The DISMX-2008 costs \$1,275.

Dowty Information Systems, Powerville Road, Boonton, N.J. 07005, or call (800) 242-7421.

■ Britton Lee expands data base machine line

Britton Lee, Inc. expanded its Shared Data Base Systems product

Crosstalk Network Because Networks



line and announced a new version of its Integrated Data Base Manager (IDM) software.

The firm announced the **BL8000** series and added new models to its existing **BL300** series.

The product line comprises mini-computers that enable mainframes, minicomputers and personal computers running IDM to access a data base management system running on the Shared Data Base System.

The new **BL8000** series is said to operate up to 10 times faster than the firm's current high-end product, the **BL700**. The **BL8000** supports such operating systems as IBM's VM/CMS and PC/DOS, Digital Equipment Corp.'s VAX/VMS and AT&T's Unix System V.

It will also support Apollo Computer, Inc. and Sun Microsystems, Inc. workstations. Those systems link to the **BL8000** via Ethernet local-area network, RS-232 or IBM block multiplexer channel connections.

The three-model **BL8000** line will support between 16M bytes and 256M bytes of random-access memory and between 1G byte and 120G bytes of storage. The systems are scheduled for shipment in July 1988 and will range in price from \$320,000 to \$599,000.

The firm's four new **BL300** models are positioned to support IBM Personal Computer work groups and such departmental minicomputer systems as DEC's VAX. Ranging in price from \$17,950 to

\$90,950, plus software license fees, the new models support 4M bytes of RAM and between 63M and 3.5G bytes of storage. The **BL300** Series can attach, via Ethernet or RS-232 communications links, to multiple-host operating systems, including IBM's PC/DOS, DEC's VAX/VMS and AT&T's Unix System V. Apollo and Sun workstations are also supported.

The firm also said it will release **IDM Version 2**. The new version is being designed to accommodate the new **BL8000** Shared Data Base System and will support SQL and IBM's DB2 DBMS.

Scheduled for release in July 1988, the host-resident **IDM Version 2** module will be priced from \$5,000 for IBM Personal Comput-

ers to \$60,000 for IBM mainframes and the DEC VAX 8900. The price for the **BL8000**-resident **IDM/RDBMS** module is \$75,000.

The firm also announced an interface linking Information Builders, Inc.'s **Focus** fourth-generation language DBMS running under IBM's VM/CMS operating system to the Shared Data Base Systems. It enables **Focus** users to access Shared Data Base Systems in the same way it accesses IBM's SQL/DS.

Sold by Information Builders, the interface to Britton Lee's **BL700** series will be available in October. An interface for the **BL8000** is scheduled for release in 1988. Additional Britton Lee-supplied IBM host-resident interface modules are required to link **Focus** to standard Britton Lee **IDM** host software.

Britton Lee, Inc., 14600 Winchester Blvd., Los Gatos, Calif. 95030, or call (408) 378-7000.

■ Gateway links Ethernet running TCP/IP to X.25

Develcon, Inc. announced a gateway that links an X.25 packet net and an Ethernet IEEE 802.3-compatible local-area network running Transmission Control Protocol/Internet Protocol.

The new gateway combines the features of the firm's existing **DevelNet** 802.3 and X.25 gateway cards. It can be used with a **DevelNet** 5003R satellite data-switching node or as a stand-alone gateway.

The 802.3 portion of the new gateway supports 64 virtual circuits and will transmit up to 150 TCP/IP-based data packets per second. It has an aggregate speed of 220K bit/sec. The X.25 portion supports 96 virtual circuits with dual-link speeds up to 100K bit/sec and will process up to 150 packets per second.

Packaged in a **Model 5003R** satellite node, the gateway is priced at \$13,500 and is available now.

Develcon, Inc., Suite E, 6701 Sierra Court, Dublin, Calif. 94568, or call (415) 829-6200.

■ Unit analyzes DS3 data stream

Telecommunications Techniques Corp. introduced an analyzer that examines the DS3 data stream used in 45M bit/sec T-3 transmissions.

The portable **T-Berd 305** detects and compiles logic, bipolar frame and parity errors on in-service and out-of-service communications links supporting DS3 transmissions. It calculates error and error-free retransmission rates. The **T-Berd 305** also measures signal, frequency and power levels on the circuit. It can be programmed to insert an error routine into the DS3 data stream when circuits are tested and includes an RS-232 port for printer support.

The **T-Berd 305** costs \$6,995. *Telecommunications Techniques Corp., 444 N. Frederick Ave., Fairthorpe, Md. 20877, or call (301) 258-5011.*

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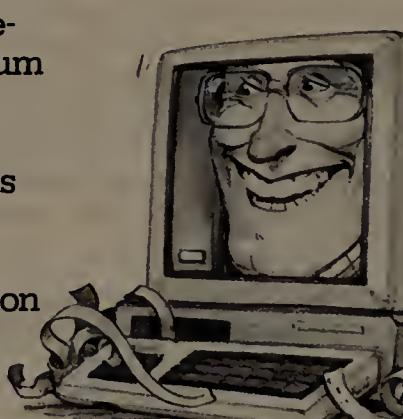
It allows you to create "script files" containing commands and entries needed to complete an individual communications session. Any user on the network can create automated "scripts" for routine sessions, and other users can repeat the sessions with a minimum of keyboard commands.

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Opinions

PERSONNEL MANAGEMENT

PETER G. W. KEEN

Maintaining people

In the world of telecommunications and computers, the machinery is well cared for. Machines have maintenance budgets. Vendors offer a myriad array of diagnostic and testing equipment. Mainframes are enshrined in perfect, dustless working environments. However, technical professionals in the same field are not nearly so well treated.

There's a new reality facing telecommunications and information services professionals and companies: the urgent need to maintain people as well as machines.

Technical professionals used to bring to their jobs a form of intellectual capital, balanced between technical experience and up-to-date technical knowledge. In today's world, however, the net worth of this knowledge capital is rapidly being depreciated. Business and application-specific skills are now more important than technical skills.

If technical professionals are to hold onto their careers and ultimately build on them, they and their employers must first face several facts:

- There's no room for average technicians. Today's market demands first-rate technicians with complete, current knowledge in their area of concentration. To stay ahead, they must ensure that their area of specialized knowledge is integrated within the entire system as quickly as possible.
- Average technicians must develop new

Keen is executive director of the International Center for Information Technologies in Washington, D.C.

business and organizational skills. They need to become "hybrids" — fluent in technology and applications.

- Organizations must stop turning good technicians into mediocre managers. Management has a key responsibility to help valued employees find their own career trajectories now that there are no longer as many neat, tidy career paths in telecommunications and information services.
- There are too many information systems people who know too little about telecommunications and vice versa. A firm grasp of both areas is necessary. Again, the key to the future lies in becoming fluent in one's area of expertise and literate about integration of that expertise within the organization.

Given these facts, it becomes obvious that the maintenance of people is critical to any organization that intends to maximize strategic advantages offered by technology.

The cornerstone of people maintenance is education. A systematic and formal two- to five-year commitment to build new technical skills (especially those relevant to integration) is as important to continued business growth as new technology. Only education can develop hybrids and build a new cadre of managers who are more than technical project leaders.

Education is not training. Typically, training follows trends in the technology to update professionals about their tools. When IBM introduced MVS/XA, it was time to send the troops to a training course. Now that Integrated Services Digital Networks is recog-

nized as imminent — even if it still is only vaguely defined — the brochures for ISDN seminars fall out of every trade magazine like leaves in autumn.

Education, unlike training, is a mobilizing force to lead change. It helps technical professionals fill new roles, not just do new tasks. Tasks are what people do; roles are how they operate. Many of the new hybrid roles require an enhanced ability to communicate, an ability to translate between business and technical issues and a sharper focus on service. In effect, a hybrid is a new form of business consultant.

Many, probably even most, middle-level professionals in the telecommunications and information services field are close to having their skills fully depreciated. This is not to say there is a lack of upper-level demand for their backgrounds. Indeed, a recent report by *Forbes* listing the 800 most powerful chief executive officers acknowledges that more than 20% come from a technical or operations background.

Middle-level professionals are being depreciated because, unlike the machines they use, they lack adequate maintenance. They need education, and they had better get it quickly.

Already, we see companies taking a hard look at their average technicians, average project leaders, average programmers and asking, "Are these the people who will lead the radical change that information technologies are bringing to every aspect of business?"

Too often, the answer is simply, no. □

STANDARDS

JAMES G. HERMAN

Is ISDN obsolete?

Next year the Consultative Committee on International Telephony and Telegraphy will ratify the first complete set of Integrated Services Digital Network standards, and equipment companies will charge ahead in a final dash to bring compliant products to market. The question, however, is whether the standards are right for today's voice and data needs.

Nearly a decade in the making, the ISDN standards are viewed as the foundation of the next generation of interfaces to public voice and data networks around the world. Since these interfaces are based on digital electronics, they essentially reduce both voice and data to common forms of information that can be flexibly combined on the link from the user to the network.

The first ISDN interface stan-

dards, to be ratified next year, define the basic information bearing, or B, channel as a 64K bit/sec pipe that can be circuit or packet switched. Voice calls are carried on a B channel in circuit-switched mode. Data connections can be either circuit or packet switched.

B channels are multiplexed onto physical-access circuits in one of two interface types. The basic rate interface comprises two B channels plus a 16K bit/sec signaling channel, or D channel (hence, 2B+D). The primary rate interface, used for connecting private branch exchanges and mainframe computers, combines 23 B channels and one 64K bit/sec D channel (hence, 23B+D). The primary rate interface operates at 1.544M bit/sec, the same as the North American T-1 standard. Since the European T-1 standard is different, the primary rate interface in Europe will have 31 B channels and one 64K bit/sec D channel.

The 64K bit/sec channel is

ISDN's basic unit of capacity. When the standards were being drafted in the early 1980s, this speed was right as a universal standard for digitizing speech (pulse code modulation), and it seemed to provide more than enough capacity for most data needs. Ironically, now that the lengthy international standardization process is finally nearing ratification, 64K bit/sec may no longer be the right choice.

On one hand, digital speech techniques have advanced, and it's now routine to compress a voice call into 32K bit/sec and retain the quality that 64K bit/sec techniques provide. Newer techniques can reduce the bandwidth required for a call to 16K bit/sec (or less, if some reduction in quality can be tolerated). Is it wise to base a worldwide upgrade of telecommunications networks on a standard known to take at least twice as much capacity as needed?

On the other hand, the rise of lo-

cal-area networks is changing the requirement for wide-area data communications. Fairly large pipes that provide local net-to-local net transfers are needed and 64K bit/sec B channels may not provide enough throughput for connecting local-area nets that range from 1M to 120M bit/sec. If fiber-optic technology becomes widespread during the next decade, it may revolutionize users' assumptions concerning the capacity requirements for data. Megabits, not kilobits, may be the right units in which to mea-

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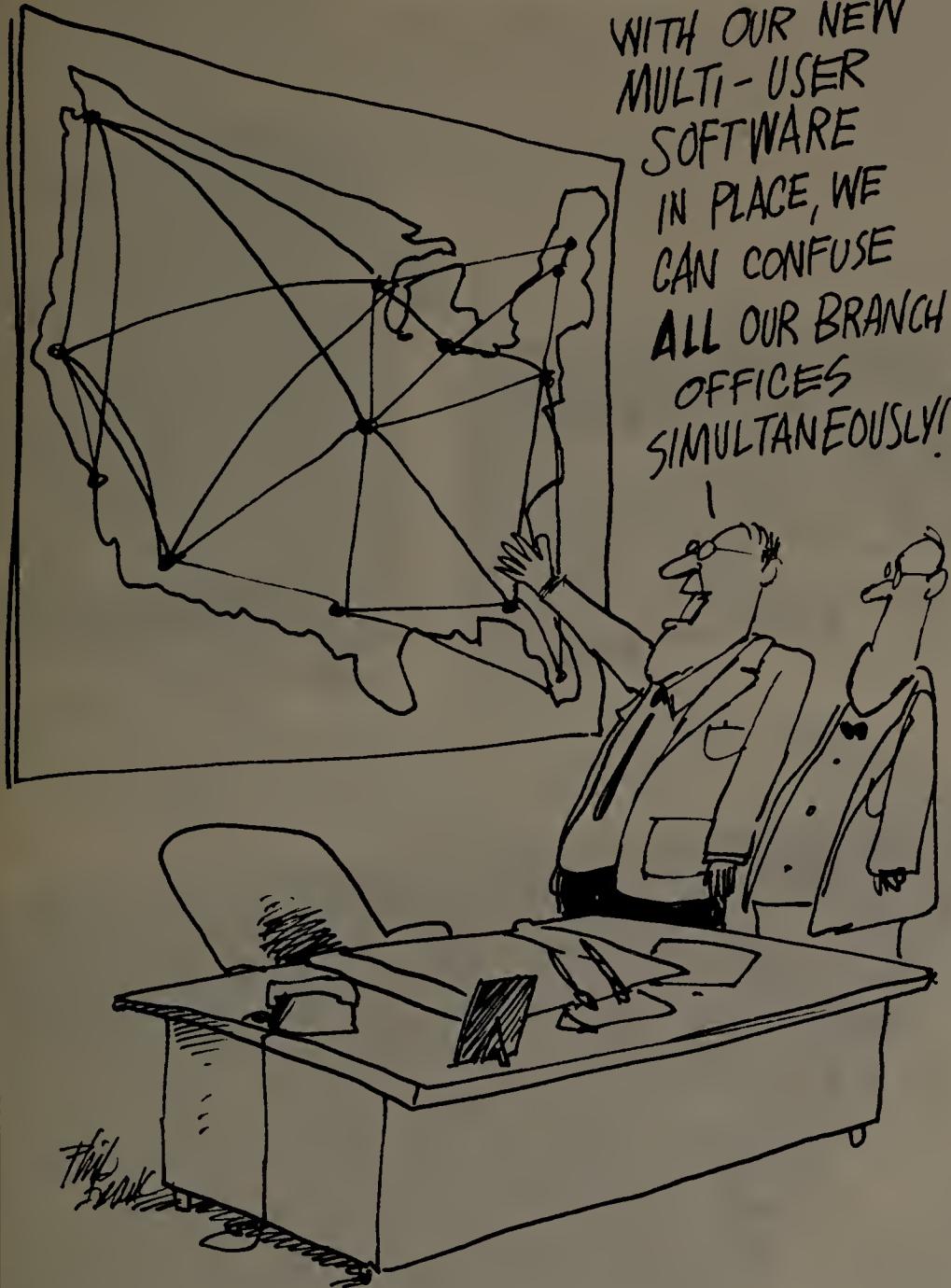
Contact Steve Moore, features editor, *Network World*, Box 9171, Framingham, Mass., 01701, or call (617) 879-0700, ext. 732.

Herman writes, teaches and consults on telecommunications technology in Cambridge, Mass.

Opinions

►TELETOONS — By Phil Frank

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TELECOMMUNICATIONS ISSUES

JAMES CARLINI

Secure the system

Barney Fyffe to Joe Friday. That's the range of security and back-up measures that different long-distance and other specialized telecommunications carriers have today.

No industry standard for security measures in physical plant facilities or in transmission facilities exists. If there's any single area in which the Federal Communications Commission could have a truly positive impact, it would be in setting definitive standards on how toll offices and central offices should be configured for system security and backup.

The de facto standard is the predivestiture operation left in place by the Bell System. The problem is that there are now many non-Bell carriers that do not adhere to the old Bell guidelines. I have been in a regional facility of a long-distance carrier that was far from secure. Intruders could get into the battery backup room from a common hallway — the door was not locked. Its main switch room was also easily accessible. This is a far cry from the tight security found at a typical AT&T toll office where, even if you prove you're an employee, you might not get access to the switch room.

In addition to security measures, the FCC should establish the levels and types of backup power a toll office should have. An AT&T toll office has alternating current power, direct current batteries and a diesel generator to ensure continued service. Other companies seldom go to that extent.

Microwave and satellite communications facilities — and transmissions — should not be exempt from these standards. With some companies installing their own satellite communications networks, such as K mart Corp., the need to address security issues is a must. In the K mart installation, all of the stores' communications will travel through the satellite link. This means security measures have to consider the vulnerability of operations if that link

Carlini is president of Carlini & Associates, a management consulting firm in Westmont, Ill. He also lectures on information technology at Northwestern University in Evanston, Ill.

should be blocked.

The need for such security was pointed out last year by the overriding of Home Box Office's signal by the raider of the airwaves known as Captain Midnight. Without supporting his actions, I commend Captain Midnight's ingenuity in that it pointed out deficiencies in HBO's network.

Riddle me this! What rings and looks like electronic Swiss cheese? Answer: a Bell central office after a disgruntled Pacific Bell employee pumped 200 shotgun shells into a central office switch. Was it an isolated incident based on the feelings of one person, or will we see more Bell Rambos across the country as layoffs and terminations occur?

Organizational security at vendor as well as customer sites has to be reevaluated. The need to know employees' backgrounds and to maintain smooth operations, especially in times of personnel layoffs or other transitions, is extremely important. The potential for sabotage and revenge by discontented employees is a manager's nightmare that has to be dealt with.

Many vendors will go through some layoffs and restructuring. Customers of any of these vendors should demand to know how their security stacks up against their competition. Have they spent money in the right places, or have they spent it on fancy commercials?

To be fair, some carriers — and customers — are working hard to beef up security and backup systems. Illinois Bell is investigating the use of a mobile central office for use in case of a disaster. More operating companies should equip their plant maintenance facilities with this type of capability.

At some securities firms in New York, the emphasis on disaster recovery can be seen in new network installations, where communications cables take up less than 10% of the available space in the conduit carrying them. The extra space enables technicians to pull new cable through the conduit fairly easily in case of an emergency.

As more companies opt to build their own networks or subscribe to multiple network services, the need to establish minimum standards for security and backup becomes clear.

sure the basic data channels of the 1990s.

Of course, there are many proposals for expanding ISDN to provide for channel types that are both smaller and larger than the 64K bit/sec B channel. However, the major benefit of ISDN standards was to be their universality and the promise that they would interconnect equipment in any part of the world from any manufacturer. If the ISDN standards change every four or eight years, how can major capital investments by the world's carriers and Post Telegraph and Telephone Administrations (PTT) be justified or planned?

Certainly there will be creative user solutions to some of those problems. Many products will spring up that fit more than one call into a single B channel. However, both of the calls will have to be switched to the same destination. Multiplexers that split large data streams into 64K bit/sec B channel-sized chunks will also be popular.

But this means trying to fit real needs into a standard that isn't right. With private network equipment vendors competing with pub-

lic providers for user dollars, the former will surely be offering new products based on advanced technology that outstrips the capabilities of ISDN. While in parts of Europe the PTTs can make ISDN law, in the pluralistic, competitive U.S. telecommunications marketplace, better products that reduce costs and improve flexibility, manageability and functionality will win over standards based on what was right five to 10 years ago.

This may be the wrong time to try to adopt universal, international standards. The technology of telecommunications is changing too rapidly, due to advances in fiber optics and protocols. Meanwhile, the applications, functionality and basic technology of data communications show no signs of reaching any kind of plateau.

The ISDN standards committees are caught in a squeeze between falling requirements for voice and rapidly rising requirements for data. The long-awaited standards may be too little, too late for data and yet be wastefully oversized for voice. It will be interesting to see whether they gain acceptance and fulfill their promise or wither and die from premature obsolescence.

Features

August 10, 1987



POLICY PERSPECTIVES

Huber holds forth

Continued from page 1

a doctorate in mechanical engineering from MIT and a law degree from Harvard University, and he clerked for U.S. Supreme Court Justice Sandra Day O'Connor. Huber is currently writing a book on liability systems for the Manhattan Institute, a New York think tank where he is a senior fellow. He is also a senior associate with Science Concepts, a Washington, D.C. consulting firm.

Although his work for the Justice Department concluded when he submitted his report, he continues to lecture on telecommunications issues to various industry groups. At the moment, Huber has no plans to work directly for any of the parties involved in the Bell system divestiture, although he plans to continue his work as an industry observer. He has written articles for publications ranging from The Harvard Law Review to The Wall Street Journal.

Huber, a resident of Washington, D.C., met recently with Network World Washington Correspondent Karyl Scott to discuss the telecommunications industry, his treatise on competition in the telephone industry and his future forays into the world of telecommunications.

Are you pleased with the response to your review of the telecommunications industry?

The reactions have been all over the map. A large volume of com-

Eight months after publication of the telephone industry report bearing his name, Peter Huber reflects on his research.

ments on the report have been filed with the court. I have to say I found very few surprises. I've yet to read anything where I sat up and said, my goodness, this is an angle, fact or set of numbers I hadn't seen before. Much of the reaction was highly predictable. People picked the things they liked and applauded those or picked the things they didn't like and tried to undercut them. That's normal. That's what the litigation process is all about. So far, I remain very

comfortable with virtually all the details in the report. For the things that look into the future, only time will tell how good the predictions are.

How did you react to criticism that your analysis didn't examine whether Bell operating company monopolies in the local exchange market were sufficiently eroded by competition to justify BOC entry into new markets?

Such criticism represents advocacy on behalf of various interest groups.

How did you arrive at a framework to judge the level of competition in various segments of the telecommunications industry?

I knew from the very beginning what the framework for this study was. It wasn't very complicated. The framework was articulated five years ago by Judge Greene in the MFJ and that's what I started with on Day 1 of this study, which is a market-by-market inquiry on whether allowing the BOCs into the market in question would create a substantial possibility that competition will be impeded. I also looked at the technological and regulatory forces that might prevent that.

Did the Department of Justice give you any directive or suggest a framework beyond what the Modified Final Judgment stipulated?

Absolutely not. In December

Continued on next page

From previous page

1985, I got a call from Douglas Ginsberg, who was then the assistant attorney general in charge of antitrust matters, asking me if I was interested in the job.

At the time I didn't know anything about the MFJ. The idea was for me to go off and write a report as required under the MFJ. We agreed that I would have complete independence. Doug Ginsberg lived up to that 100%. There was no interference. I was given no directive on where I was supposed to head or how it was supposed to come out. I wrote the report without consulting any of the officials at Justice. I handed the report over to them, and they released it in the form I gave it to them.

Did you examine the effectiveness of Federal Communications Commission regulations designed to prevent BOC monopoly abuses?

I looked at the existing regulatory framework. I looked at where regulation had been and where it

was likely to go, and I feel the report was fairly critical and objective about it. I never saw FCC regulation as a simple panacea for all problems, and Judge Greene has never accepted that view either, but you simply cannot ignore this huge regulatory framework at both

the federal and state level when you talk about anticompetitive possibilities.

How would you assess the overall effect of regulation? Has it appropriately balanced the interests of the industry and consumers, or has it impeded technological and market development?

We're talking about \$150 billion worth of markets, and regulation is all over the map. It's hard to generalize about regulation. Regulation has been very productive in areas such as equal access. The MFJ gave the initial thrust requiring equal access, and the FCC carried out that policy.

In the local exchange market, regulation has lagged. One of the major anticompetitive forces in local exchange is regulation — the exclusive franchise that grants many local telephone companies an exclusive market. In areas like this, you have regulation holding back what technology makes possible — sometimes for plausible reasons.

In the area of information services, I'm inclined to think the market is out ahead of regulation.

"It's hard to generalize about regulation. It has been very productive in areas such as equal access. In the local exchange market, regulation has lagged."

The FCC is now scrambling to adapt its regulation to the new market possibilities, and I think Judge Greene is seriously considering that possibility as well.

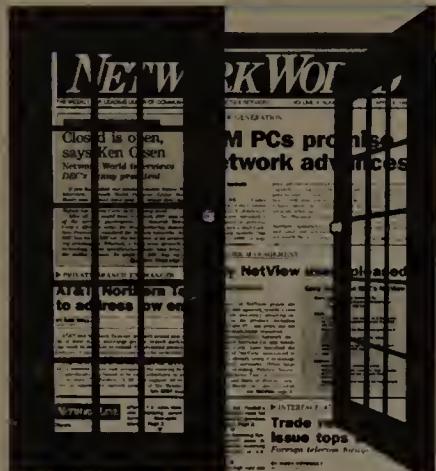
Do you think the new Third Computer Inquiry accounting and reporting rules will be adequate to police BOC activities and prevent abuses?

Separate accounting and separate subsidiaries are administrative attempts to keep costs straight, and they've never been hugely effective. The greater the efficiencies of integrating functions in the local exchange, the greater the possibility of cross-subsidization. This is a paradox you can never get away from. With that said, I think the FCC is putting together the most sensible and reasonable package possible on these cost matters.

We have no choice but to go forward because there are important things that can be done through

Continued on page 28

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HUBER HOLDS FORTH

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September 14: PACKET SWITCHES

Packet switching can be a sensible, money-saving technology for many data network professionals. And this Product Focus gives users the full story.

September 21: T-1 SERVICES

T-1 service is still a hot topic among managers who have high-volume transmission needs, but whether users are getting the most bandwidth for their buck is still unanswered.

From page 26
greater use of the local exchange.

There's been a great deal of criticism of the new FCC-mandated accounting plans to which the BOCs will be subjected. Under those rules, the BOCs will be required to hire outside accounting firms to monitor their books. There is concern that the FCC is relinquishing its authority to

"A lot of people are protecting their little business tents, and they need high regulatory walls around them to protect their turf."

monitor BOC accounting practices. Do you agree?

The fact that there's a great deal of criticism in this industry never tells you anything. A lot of people are protecting their little business tents, and they need high regulatory walls around them to protect their turf. The [Securities and Exchange Commission] relies heavily on outside accounting agencies to check the books of public corporations. I would not hold accounting up as a perfect answer. In some areas, structural separation should be preserved, such as in nontelecommunications businesses. As you get closer to related markets there are large potential efficiencies to be realized through consolidation and integration of personnel, engineering and marketing. You have to realize that accounting purity will often translate into a loss of valuable services. The best I can tell is that the FCC is on a pretty reasonable and sensible course.

Do you agree with the argument that the BOCs are in the best position to offer certain services, both from an economic and technological standpoint?

There are a range of services the BOCs can provide to the mass market more cheaply and efficiently than anyone else, but there is no service that only the BOCs can provide, including local exchange service. One could take a bunch of private lines and link them up to create a network resembling the BOC local exchange. If you look at what's being done with private networks, cellular networks and foreign telephone networks, you repeatedly see certain communications capabilities being brought very close to the central office switch and being provided by an array of competing providers.

If the BOCs are deregulated and allowed to compete in new

telecommunications markets, do you think they will devote less attention and few resources to supplying consumers with high-quality basic service?

In the end, the consumer is best served by the most vibrant competition possible. Sometimes competition and change verge on anarchy, but overall I think it's the best system we have. If competition is the paramount goal, how do we promote it? The theory in 1982 was to keep the BOCs out of manufacturing, long-distance and information services in order to promote competition in these markets. Now we are reassessing that decision to see if competition would be better served by letting the BOCs in. The market will continue to demand high-quality service, no matter what activities the BOCs get into.

Some observers argue that as BOC competition intensifies, the need for them to differentiate themselves from each other will increase. Users worry that the BOCs will design their networks in a highly proprietary, nonstandard way to guarantee market share and control. Do you view this as a realistic possibility?

Competition and innovation always imply a departure from the established norm. Gaining a competitive edge always requires doing something better, in a new way. Standardization is always desirable to keep the national network functioning smoothly and to lower entry barriers to other competitors, but today's network has the intelligence and ability to tolerate a high degree of nonstandardization. Will the BOCs succeed in balkanizing the networks if given free rein? There are powerful market incentives against this.

Do you think the pendulum that has been moving toward deregulation might swing back to

"There will be fits and starts, but unlike areas such as the airline industry, I doubt reregulation is possible or desirable."

ward more of a regulated environment with the advent of political and economic changes?

There will be fits and starts, but unlike areas such as the airline industry, I doubt reregulation is possible or desirable. Technology is making competition more and more possible. Information is an extraordinarily fluid commodity, and it's very hard to confine it in these regulatory containers. □

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Service Focus: Digital data services

Son of DDS

BY SUSAN M. GATELY
AND LISA A. GOETZE

Special to Network World

Since their introduction in the mid-1970s by AT&T, digital data transport services have failed to take the communications market by storm.

In fact, AT&T's original Data-phone Digital Service, as well as other digital data services (DDS) provided by postdivestiture Bell operating companies, never achieved anywhere near the rate of market development forecasted by these providers. Offerings from independent carriers have recently gained a very small foothold but have failed to ignite any sort of market growth.

Various reasons for this inactivity have been offered by AT&T, the BOCs and market observers. Those most often mentioned are

Gately and Goetze are senior analysts for Economics and Technology, Inc., a Boston-based research and consulting firm.

lack of demand, tariff and network constraints — including differences in local network configurations — as well as the relatively high price of DDS vs. analog data services.

A younger generation

The initial DDSs were full-time,

The second generation of BOC digital data transport services is making market waves.

centrally hubbed and clocked services that offered very high levels of error-free performance for most data communications applications. However, developments in modems and other data equipment continued to improve the price and performance characteristics of analog lines, which were usually much less expensive than DDS. At divestiture, 85% to 90% of data lines remained analog.

Now, due to the further development of digital central offices and digital-quality distribution plants, the original conception of digital communications links is undergoing some significant changes. A second generation of digital data transport services from AT&T and the BOCs is making waves in the market.

Each of these new services represents potential improvements in the price or performance characteristics of the traditional Data-phone service offerings. In combination, these new services and others likely to be developed dem-

Continued on next page

Availability of new digital data service options in interstate tariffs varies by operating company

Chart 1

Regional Bell holding company	Bell operating company	Secondary channel service	Public packet switching	Switched 56K bit/sec service	Basic digital service
Nynex Corp.	New York Telephone Co.		New York	New York	
	New England Telephone		Massachusetts, Maine, New Hampshire, Rhode Island, Vermont	Massachusetts, Maine, New Hampshire, Rhode Island, Vermont	
BellSouth Corp.	Southern Bell Telephone and Telegraph Co.	Florida, Georgia, North Carolina, South Carolina	Florida, Georgia, North Carolina, South Carolina		*
	South Central Telephone Co.	Alabama, Kentucky, Louisiana, Mississippi, Tennessee	Alabama, Kentucky, Louisiana, Mississippi, Tennessee		*
Pacific Telesis Group	Pacific Bell	California	California		
Southwestern Bell Corp.	Southwestern Bell Telephone Co.	Arkansas, Kansas, Missouri, Oklahoma, Texas	Arkansas, Kansas, Missouri, Oklahoma, Texas		*
Ameritech	Illinois Bell		Illinois		
	Indiana Bell	Indiana	Indiana		*
	Michigan Bell	Michigan	Michigan		*
	Ohio Bell				
	Wisconsin Bell				
US West, Inc.	Mountain Bell	Arizona, Colorado, Idaho, New Mexico, Utah	Arizona, Colorado, Idaho, New Mexico, Utah		
	Northwestern Bell	Iowa, Minnesota, Nebraska, South Dakota	Iowa, Minnesota, Nebraska, South Dakota	Iowa, Minnesota, Nebraska	
	Pacific Northwest Bell	Oregon, Washington	Oregon, Washington		*
Bell Atlantic Corp.	Chesapeake and Potomac Telephone Co.		Washington, D.C., Maryland, Virginia, West Virginia		
	Bell of Pennsylvania		Pennsylvania, Delaware		*
	New Jersey Bell		New Jersey		*

Note: Some services listed above have yet to become effective.

* State tariffs are in effect.

SOURCE: ECONOMICS & TECHNOLOGY, INC., BOSTON

From previous page
onstrate that the carriers want to accelerate the movement from analog lines in the second generation of digital transport.

T-1 service is one of the best examples of the new generation. Al-

sively than with traditional DDS.

The new generation is manifested further by a host of new service offerings by the BOCs, such as public packet-switching services, tariffed under a variety of service names. To a purist, packet switch-

terstate access tariffs submitted to the Federal Communications Commission. Chart 1 on page 29 illustrates the current interstate availability of the four classes of service described above.

This list is changing rapidly. For example, Ameritech filed a tariff July 17 extending the offering of secondary channel services to Illinois, Ohio and Wisconsin. These services are scheduled to go into effect Aug. 30.

Back to basics

It is worth noting that these second-generation, "basic" digital services have yet to appear in any interstate access tariffs filed by Bell

port areas.

For this reason, these basic digital services cannot be considered to be fully available. Full availability exists only when the services are tariffed both at the state and federal levels, since state public utility commissions may acquiesce in, or even impose, certain limitations on the availability and use of services that the FCC might not permit. For example, the FCC usually requires that any new service be offered throughout a telephone company's service area as soon as it is technically feasible to do so. Many states may not explicitly impose a similar requirement but will leave the geographic availability

T-1 service is one of the best examples of the new generation of digital services. T-1 service is now priced much more attractively than either DDS or analog services for large-volume users.

though not available until about five years ago, T-1 service is now priced much more attractively than either DDS or analog services for large-volume users. Many users have vastly increased their orders for T-1 lines. And, equally important, a large number of vendors have entered the market for multiplexing and other equipment utilized with T-1 lines.

According to one industry analyst, customers are ordering T-1 because it's "something new that works" and because users sending or receiving data at 2,400 or 4.8K bit/sec can multiplex and get more out of their T-1 lines less expen-

ing might not be properly classified merely as a digital transport service because packet-switching services can be accessed via analog dial-up lines as well as through dedicated digital links. However, the public packet-switching tariffs do ultimately involve digital transport.

Other new digital services being tariffed at the state level include switched 56K bit/sec services, secondary channel services and a variety of basic digital transport services.

The availability of these services is increasing generally in local tariffs and in the important in-

Other new digital data transport services being tariffed at the state level include switched 56K bit/sec services, secondary channel services and a variety of basic digital transport services.

Atlantic Corp., BellSouth Corp., Ameritech, US West, Inc. or Southwestern Bell Corp. These companies have so far been confined to offering digital transport services within their local access and trans-

of the service to the carrier's discretion.

Limited availability notwithstanding, the basic digital services offer prices generally, but not always, below the prices associated

Local exchange carrier interstate-access tariff rates for secondary channel services†*
Chart 2

State	Bell operating company	For use with 2,400, 4.8K and 9.6K bit/sec DDS channels			For use with 56K bit/sec DDS channels		
		Installation			Installation		
		Monthly	Initial	Subsequent	Monthly	Initial	Subsequent
Alabama	South Central Telephone Co.	\$15.00	\$7.61	\$223.38	\$15.00	\$7.61	\$223.38
Arizona	Mountain Bell	\$15.00		\$43.90	\$15.00		\$43.90
Arkansas	Southwestern Bell Telephone Co.	\$12.00	\$97.55	\$97.55	\$12.00	\$97.55	\$97.55
California ³	Pacific Bell	\$11.79- \$18.67		NA ²	\$29.48		NA ²
Colorado	Mountain Bell	\$15.00		\$42.50	\$15.00		\$42.50
Florida	Southern Bell Telephone and Telegraph Co.	\$14.96	\$6.79	\$201.10	\$14.96	\$6.79	\$201.10
Georgia	Southern Bell Telephone and Telegraph Co.	\$14.95	\$4.53	\$168.99	\$14.95	\$4.53	\$168.99
Idaho	Mountain Bell	\$15.00		\$46.35	\$15.00		\$46.35
Indiana	Indiana Bell	NA	NA	NA	\$29.00		1
Iowa	Northwestern Bell	\$15.00		\$49.50	\$15.00		\$49.50
Kansas	Southwestern Bell Telephone Co.	\$12.00	\$96.87	\$96.87	\$12.00	\$96.87	\$96.87
Kentucky	South Central Telephone Co.	\$15.00	\$8.46	\$213.83	\$15.00	\$8.46	\$213.83
Louisiana	South Central Telephone Co.	\$15.00	\$7.27	\$229.69	\$15.00	\$7.27	\$229.69
Michigan	Michigan Bell	\$15.00		1	\$21.00		1
Minnesota	Northwestern Bell	\$15.00		\$51.05	\$15.00		\$51.05
Mississippi	South Central Telephone Co.	\$15.00	\$7.95	\$219.47	\$15.00	\$7.95	\$219.47
Missouri	Southwestern Bell Telephone Co.	\$12.00	\$96.87	\$96.87	\$12.00	\$96.87	\$96.87
Nebraska	Northwestern Bell	\$15.00		\$42.35	\$15.00		\$42.35
New Mexico	Mountain Bell	\$15.00		\$44.15	\$15.00		\$44.15
North Carolina	Southern Bell Telephone and Telegraph Co.	\$14.75	\$4.35	\$157.10	\$14.75	\$4.35	\$157.10
Oklahoma	Southwestern Bell Telephone Co.	\$12.00	\$92.20	\$92.20	\$12.00	\$92.20	\$92.20
Oregon	Pacific Northwest Bell	\$15.00		\$68.31	\$15.00		\$68.31
South Carolina	Southern Bell Telephone and Telegraph Co.	\$14.95	\$4.82	\$170.04	\$14.95	\$4.82	\$170.04
South Dakota	Northwestern Bell	\$15.00		\$45.80	\$15.00		\$45.80
Tennessee	South Central Telephone Co.	\$15.00	\$7.04	\$220.89	\$15.00	\$7.04	\$220.89
Texas	Southwestern Bell Telephone Co.	\$12.00	\$91.92	\$91.92	\$12.00	\$91.92	\$91.92
Utah	Mountain Bell	\$15.00		\$43.10	\$15.00		\$43.10
Washington	Pacific Northwest Bell	\$15.00		\$79.27	\$15.00		\$79.27

DDS = Digital data service

SOURCE: ECONOMICS & TECHNOLOGY, INC., BOSTON

† Rates are as filed in local exchange carrier interstate-access tariffs, both pending and approved. The US West, Inc. data includes a rate of \$20.00 per month for secondary channels derived from DSO lines multiplexed from T-1 channels. That charge applies per Digital Data Connecting Arrangement connection. The tariffs of the other carriers offering secondary channel service neither offer nor restrict the derivation of a secondary channel from a DDS circuit multiplexed from a T-1 channel.

* Rates for AT&T Tariff 11 Service are 10.2% higher than the rates displayed here.

¹ If secondary channel service is ordered subsequent to the initial installation of a DDS circuit, it is treated as a disconnection of the existing circuit and a new installation of a DDS circuit with the secondary channel feature. Therefore, although there is not a specific installation rate element, there is an installation cost associated with the installation of the secondary-channel service option on an existing DDS circuit.

² Not available on existing DDS circuits.

³ Separate rates apply for each DDS speed as follows: 2,400 bit/sec — \$11.97, 4.8K bit/sec — \$14.74 and 9.6K bit/sec — \$18.67.

with DDS. An illustration of this is the 56K bit/sec digital service offered by New Jersey Bell, Southern Bell Telephone and Telegraph Co. in Georgia, Illinois Bell and Pacific Northwest Bell in Washington state. Each company's price for this basic digital service is from 35% to more than 50% below DDS prices.

Dirty digital

Because these basic digital services are not centrally hubbed, none of them matches the error-performance characteristics of the traditional DDS offerings. This is a major reason for the lower cost of the "dirty digital" services. While DDS is designed to average 99.5% error-free seconds of data transmission, there is no statement of expected error levels in the tariffs for basic digital services.

For greater error reduction, other methods of maintaining suitable error performance must be devised outside the network

The BOCs' basic digital service offerings represent an important new option and illustrate a downward trend in prices.

links themselves.

Within this performance constraint, however, the basic digital transport service prices are much closer to the rates for analog lines.

In an example using DDS and basic services offered by Southwestern Bell in Houston, DDS prices are more than twice as expensive as analog services. "Dirty digital" services cost only about 25% more than similar analog services.

Money well spent

While this is still a sizable premium to pay for digital transport, the analog prices do not include such necessary items as modems and line conditioning and do not offer equal

levels of reliability and performance.

At the very least, the BOCs' basic digital service offerings represent an im-

portant new option and illustrate the downward trend in prices that, until now, clearly presented the greatest barrier to popular

utilization of digital transport services.

Switched 56

Switched 56K bit/sec

Three BOCs offer true switched 56K bit/sec services: New York Telephone Co., New England Telephone and Northwestern Bell.

service has been anticipated in the industry for some time. Currently, only three BOCs offer true switched 56K bit/sec access services, as shown on Chart 1: New York Telephone Co., New England Telephone and Northwestern Bell. Users outside these areas that need access to switched 56 capabilities can link up with the service through

Continued on next page

What's the Score in Distributed Matrix Switching?

	Data Switch	Other
1 Does the vendor offer a true distributed matrix switch (versus an electronic patch panel)?	Yes	
2 Is the distributed switch fully operational at the maximum announced matrix size when all satellite switches are attached?	Yes	
3 Are there any documented problems with the control software, resulting in inability to control the switch?	No	
4 Are systems being delivered to customers as promised, or have shipments been delayed?	Yes—on time	
5 How many latest-generation distributed switches have been shipped to customer sites?	200+	
6 Can references be contacted, with sites visited?	Yes	
7 How large is the vendor's in-house service organization?	75	
8 Is local customer service available from vendor's in-house organization?	Yes	
9 Is performance monitoring integrated in the distributed matrix switch?	Yes	
10 How much distance does the switch allow between DTE and DCE?	600'	
11 Does the switch provide V.35 support with no sacrifice in RS-232 ports?	Yes	

It's time to add up the score in the distributed communications matrix switch marketplace. Tear out this ad, and compare the capabilities and availability of competitive distributed switching systems with the proven criteria established by our Data Switch Galaxy-Plus.

At Data Switch, we know that Galaxy-Plus is the most advanced, proven switch available today. And, we know that no competitor within our markets can match the service and support we offer.

Prove it to yourself. Try to find any competitive switch that matches the 11 evaluation criteria set by Galaxy-Plus. Then call our Data Path Management Specialists at 1-800-328-3279; in Connecticut, 926-1801; or write Data Switch Corporation, One Enterprise Drive, Dept. 30, Shelton, CT 06484. We'll be pleased to demonstrate that Galaxy-Plus stands alone as the only choice for your data communications network application. At Data Switch, we deliver on our promises.



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The Data Path Management Company

From previous page local DDS or "dirty digital" lines. AT&T offers nationwide switched 56 services between central offices, as well as dedicated digital-access lines.

Full availability of local switched 56 access services and the development of more products and applications for the service may be required before switched 56 services achieve market significance. Currently, switched 56 is almost universally utilized for backup of existing data lines. The lack of frequent-use applications for switched 56 has led AT&T to amend its tariff to require a monthly \$75 minimum usage charge.

Secondary channel services rep-

resent one of the best examples of the increased functionality and performance in the second-generation digital transport services (see Chart 2 on page 30). The secondary channel provides the capability to derive an independent, slower speed auxiliary channel opera-

ting in parallel with a primary DDS channel without reducing the operating speed of the primary channel.

Thus, secondary channels may enable network functions similar to those of Integrated Services Digital Network, involving signaling,

varying I/O formats and network management features.

Secondary channels either are or will soon be available in most states as well as in AT&T's private-line tariffs.

Right now, AT&T and the BOCs control 90% to 95% of the digital data transport market. With the possible exception of Southern New England Telephone, most independent carriers and providers do not have digitally conditioned lines. Until independent providers can build and support fully digital conditioned lines, the market will continue to be dominated by AT&T and the BOCs.

Back to the future

In the services that are switched, such as switched 56, or that depend on functions that take place at switching centers, like dirty digital, the BOCs and AT&T should continue to dominate since they have the buildings and switches in place.

There are many more potential players, especially in the long-haul and regional markets. Many companies are putting in fiber-optic networks; some plan to be in the



“... Network World clearly stands head and shoulders above the competition. One big reason is its networking focus.”

Dick Hichens is Senior Technical Network Analyst for ALLTEL Corporation of Hudson, Ohio. The thirteenth largest telephone utility in the United States, ALLTEL provides cellular phones, wide-area paging services, fiber optic-based phone equipment and more to customers in 19 states. Dick is involved in purchasing ALLTEL's network communications equipment.

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"And it's a big part of my decision-making process. It works for me in two ways: articles give me detailed information on products and technologies, and advertisements provide a road map to vendors."

"I read other communications publications, but *Network World* clearly stands head and shoulders above the competition. One big reason is its networking focus. And I have many colleagues who'll tell you the same thing."

Every week, more than 65,000 purchase-involved subscribers like Dick Hichens look to *Network World* for information that can help them — and their companies — stay ahead. If you market communications/networking products and services, there's no better place to reach a powerful audience of buying decision makers. Call your local *Network World* sales office and reserve space for your ad today.

Users will likely continue to look to the BOCs or other local providers to make available data transport services.

digital market exclusively.

However, since very few of these companies plan to install big central office switches, their efforts are mostly in the dedicated, or nonswitched, digital transport market.

There has been a lot of talk in recent years about local- or metropolitan-area digital services. But so far, not a lot has happened. Outside of Teleport Communications in lower Manhattan and Chicago Fiber-Optic Co. in Chicago, the rest of these ventures are all "paper networks."

BOC domination

A simple but major reason for BOC domination is that, as independents install their long-haul fiber networks, they will never run fiber to each and every building in each town along the route. Users will likely continue to look to the BOCs or other local providers to make available local data transport services.

In fact, most of the fiber networks today aren't fiber: They're paper. And until these networks go from paper to actual glass strands, the BOCs and AT&T will continue to dominate digital data transport services. □

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THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

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1 My primary areas of activity. (Circle ONE only)

I am involved in evaluating communications (data, voice and/or image) products and services:

1. for use within my own company/organization
2. for resale to other companies/organizations
3. Both
4. Other (explain) _____

1a For communications, my primary responsibility is: (Circle ONE only)

1. Data Communications
2. Voice Communications
3. Both
4. Other (explain) _____

2 Circle only the ONE title classification which most applies to you.

Company Management

11. Chairman, Pres., Owner, Gen. Mgr., Partner, Director, CEO, VP, Dir. Head of Finance, Admin. Procurement

Communications Management

Data Communications

21. Management
VP, Dir., Mgr., Head, Chief: Data Communications, including Networks, Engineering, Design, R&D, Application Development

22. Supervisory/Staff:
Supervisor, Head: Networking, Design, Analysis, Engineering, R&D, Applications, Services

Telecommunications

31. Management
VP, Dir., Mgr., Head, Chief: Telecomm., Voice Comm., including Networks, Engineering, Design, R&D, Application Development

32. Supervisory/Staff: Supervisor, Head: Networks, Design, Analysis, Engineering, R&D, Applications Services

Factory Communications

41. Management

42. Supervisory/Staff

MIS/Data Processing

51. Management
VP, Dir., Mgr., Head, Chief: MIS/DP, Systems Application Development, Operations, Office Automation

52. Supervisory/Staff: Supervisor, Head of Systems Design, Analysis Applications

Others

75. Consultant

80. Educator

85. Financial Analyst

90. Marketing/Sales

95. Other _____

3 Job Function

Which one of the following best describes your functional involvement with communications (data, voice, and /or video) products? (Circle ONE only)

Corporate

1. Business Management, Planning and/or Development
2. Management, Planning and/or Development
3. Implementation and/or Operation
4. Other _____

4 Which one of the following best describes the primary business activity of your organization at this location? (Circle ONE only)

Consultants

11. DP/Communications Consulting Services
12. Consulting Services (except DP/ Communications)

End Users

13. Manufacturer (other than computer/communications)
22. Finance/Banking/Insurance/Real Estate
23. Education
24. Medicine/Law
25. Wholesale/Retail Trade
26. Public Utility/Transportation
27. Mining/ Construction/ Petroleum Refining/ Agriculture/ Forestry
28. Business Services (excluding DP/Communications)
29. Government: Federal
30. Government: State/Local

Vendors

41. Carrier: including AT&T, BOCs, Independent Telcos, Public Data Networks, International Records Carriers
42. Interconnect
43. Manufacturer Computer/Communications Equipment
44. Value Added Reseller (VAR), Systems House, Systems Integrator
45. Distributor
46. DP/Communications Services (excluding consulting)
95. Other _____

5 In which ways do you typically become involved in acquiring communication products (data, voice, and/or video) and services? (Circle ALL that apply)

1. Recommend/Specify
2. Identify/Evaluate Potential Vendors
3. Approve the Acquisition
4. None of the Above

6 Check ALL that apply in columns A and B.

A. I am personally involved in the acquisition process (specification, selection, approval) for the following products and services:

B. These products and services are presently in use at this location:

A	B	Product/Services	A	B	Product/Services
Computers		Transmission/Network Services Equipment			
01. <input type="checkbox"/> <input type="checkbox"/> Micros	18. <input type="checkbox"/> <input type="checkbox"/> Microwave	19. <input type="checkbox"/> <input type="checkbox"/> Satellite Earth Stations	20. <input type="checkbox"/> <input type="checkbox"/> Local Area Networks		
02. <input type="checkbox"/> <input type="checkbox"/> Minis	21. <input type="checkbox"/> <input type="checkbox"/> Wide Area Networks	22. <input type="checkbox"/> <input type="checkbox"/> Packet Switching Equipment	23. <input type="checkbox"/> <input type="checkbox"/> Fiber Optic Equipment		
03. <input type="checkbox"/> <input type="checkbox"/> Mainframes	34. <input type="checkbox"/> <input type="checkbox"/> T1	35. <input type="checkbox"/> <input type="checkbox"/> Communications Services	36. <input type="checkbox"/> <input type="checkbox"/> Centrex		
04. <input type="checkbox"/> <input type="checkbox"/> Printers	05. <input type="checkbox"/> <input type="checkbox"/> Communications Processors	06. <input type="checkbox"/> <input type="checkbox"/> Digital Switching Equipment	24. <input type="checkbox"/> <input type="checkbox"/> Packet Switching Services	25. <input type="checkbox"/> <input type="checkbox"/> Cellular Mobile Radio Services	
	07. <input type="checkbox"/> <input type="checkbox"/> Comm./Networks Software	07. <input type="checkbox"/> <input type="checkbox"/> Facsimile	26. <input type="checkbox"/> <input type="checkbox"/> Electronic Mail	27. <input type="checkbox"/> <input type="checkbox"/> Enhanced Services	
	08. <input type="checkbox"/> <input type="checkbox"/> Digital Switching Equipment	08. <input type="checkbox"/> <input type="checkbox"/> Modems	28. <input type="checkbox"/> <input type="checkbox"/> Long Haul Services	29. <input type="checkbox"/> <input type="checkbox"/> BOC Services	
	09. <input type="checkbox"/> <input type="checkbox"/> Protocol Converters	09. <input type="checkbox"/> <input type="checkbox"/> Multiplexers	30. <input type="checkbox"/> <input type="checkbox"/> Independent Telco Services	31. <input type="checkbox"/> <input type="checkbox"/> Factory Communications	
	10. <input type="checkbox"/> <input type="checkbox"/> Intelligent Terminals	11. <input type="checkbox"/> <input type="checkbox"/> Network Mgmt. & Control	32. <input type="checkbox"/> <input type="checkbox"/> Key Systems	33. <input type="checkbox"/> <input type="checkbox"/> Online Data Bases	
		12. <input type="checkbox"/> <input type="checkbox"/> Test Equipment	13. <input type="checkbox"/> <input type="checkbox"/> 3270 Controllers		
		14. <input type="checkbox"/> <input type="checkbox"/> Protocol Converters	35. <input type="checkbox"/> <input type="checkbox"/> Intelligent Terminals		
		15. <input type="checkbox"/> <input type="checkbox"/> PBXs	16. <input type="checkbox"/> <input type="checkbox"/> Centrex		
		17. <input type="checkbox"/> <input type="checkbox"/> Key Systems	18. <input type="checkbox"/> <input type="checkbox"/> Long Haul Services		
		19. <input type="checkbox"/> <input type="checkbox"/> Central Office Equipment	20. <input type="checkbox"/> <input type="checkbox"/> BOC Services		
		21. <input type="checkbox"/> <input type="checkbox"/> Integrated Voice/Data Terminals	22. <input type="checkbox"/> <input type="checkbox"/> Independent Telco Services		

7 Estimated value of communications systems, equipment and services:

A. which you helped specify, recommend or approve in last 12 months?
(Check only ONE in column A.)

B. which you plan to specify, recommend or approve in next 12 months?
(Check only ONE in column B.)

A	B
1. <input type="checkbox"/> <input type="checkbox"/> \$10 million and over	6. <input type="checkbox"/> <input type="checkbox"/> \$100,000 - \$249,999
2. <input type="checkbox"/> <input type="checkbox"/> \$5 million - \$9.9 million	7. <input type="checkbox"/> <input type="checkbox"/> \$50,000 - \$99,999
3. <input type="checkbox"/> <input type="checkbox"/> \$1 million - \$4.9 million	8. <input type="checkbox"/> <input type="checkbox"/> Under \$50,000
4. <input type="checkbox"/> <input type="checkbox"/> \$500,000 - \$999,999	9. <input type="checkbox"/> <input type="checkbox"/> Don't Know
5. <input type="checkbox"/> <input type="checkbox"/> \$250,000 - \$499,999	

8 Estimated gross annual revenues for your entire company/institution:

(Circle ONE only)

1. Over \$1 billion
2. \$500 million to \$1 billion
3. \$100 million to \$499.9 million
4. \$50 million to \$99.9 million
5. \$10 million to \$49.9 million
6. \$5 million to \$9.9 million
7. under \$5 million

9 Estimated number of total employees at this location:

(Circle ONE only)

1. Over 5,000
2. 1,000 - 4,999
3. 500 - 999
4. 250 - 499
5. 100 - 249
6. 50 - 99
7. 20 - 49
8. 1 - 19

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NETWORK WORLD

PLEASE TAPE HERE 

► RETAIL NETWORKING

The selling of a network

BY JAMES E. HAKLIK

Special to Network World

When Cole National Corp.'s Corporate Telecommunications Department was formed in May 1986, the retailer's Retail Information System (RIS) project was in trouble. The project was of strategic importance to the firm's Vision Corp. division, yet reliability problems and cost overruns had delayed its completion and threatened its cancellation.

With new administration, however, the project's fortunes took a turn for the better. New solutions reduced projected telecommunications expenses by 85%, or about \$1 million, per year and provided justification for implementing the project.

Cole National Corp. is a diversified retailer with \$1 billion in annual revenues that operates chains of stores in malls and shopping

centers nationwide. Its retail stores include toy stores, key-making shops, engraving shops, a baked goods store and optical shops. The Cole Vision Corp. division, composed of optical goods stores, generates \$150 million in annual sales and is a key contributor to the organization.

Transmission troubles
The RIS application is designed to support order entry at 575 specialty retail stores via IBM Personal Computer ATs. In the original design, store personnel entered information about customer orders, sales and inventories into a Personal Computer AT. Twice a day,



the store manager sent the information to a data base at IBM's Information Exchange in Tampa, Fla. Then a computer at Cole's MIS facilities in Cleveland called IBM's computer to retrieve the information. Unfortunately, a 26-store pilot application revealed average monthly transmission costs of about \$550 per store, and there were network reliability problems.

Today, the average monthly transmission cost is \$100 per store (it's expected to go down to \$25

when all 575 stores are on-line), and reliability is greatly improved. This has been achieved by redesigning the application, selecting a new carrier, eliminating communications problems and by having the IBM Personal Computer AT perform all communications tasks automatically.

Costs cut

The telecommunications department's first concern was to reduce
Continued on next page

Haklik is corporate manager of telecommunications at Cole National Corp. in Cleveland.

From previous page

the costs of transmitting and storing data. Its objective was to pick up data at several remote locations and deliver it to a central site at the lowest possible cost, in a timely manner and with minimum breakdowns. By contrast, the existing approach had two data storage depots (Tampa and Cleveland), twice the number of route miles required and too many breakdowns along the way.

The department's recommendation: Simplify this process by reducing the number of storage depots, eliminating redundant route miles and reducing the number of potential points of failure.

The first step was to understand the existing application. The next was to perform a conceptual redesign that would resolve the communications problems without adding data processing problems. The project team decided to do this by changing the host computer application programs and reevaluating potential service providers.

It was also decided that the Personal Computer AT should continue to initiate file transfers. This approach allows the Personal Computer AT to off-load some tasks from the mainframe. The Personal Computer AT also can dial the mainframe automatically at preset times or when a threshold for the maximum number of transactions is reached. Under special circumstances, store managers can also initiate calls manually. Finally, modular network components were used wherever possible.

Vendor selection

Next, the group began searching for network and communications software that would meet its design criteria and cost and quality requirements.

The telecommunications group decided to buy a communications package, rather than develop its own, because it lacked time and expertise. Packages such as Data General Corp.'s Blast, VM Personal Computing, Inc.'s Relay Gold, Masscomp's Kermit, Simware, Inc.'s SIM3278 and Packet/PC, Inc.'s Packet/3270 were considered. Requirements included strong vendor support, good references, site-license availability and a trial period. A Personal Computer command language, error-correcting protocol, Personal Computer- and host-application program interface, automatic restart facility and an IBM 3725/Network Control Program (NCP) software interface were also important. After a thorough analysis, Packet/PC's Packet/3270 was selected.

The project team next examined network offerings, including IBM's Information Exchange Network (for transport only), AT&T and Control Data Corp.'s Public Data Network (PDN), AT&T's 800 Number Service, Sears Communications Network, Inc.'s Systems Network Architecture/Synchronous Data Link Control private network and PDN offerings from Telenet Communications Corp. and CompuServe, Inc.

To help select a vendor, the pro-

ject team constructed a matrix using Lotus Development Corp.'s Lotus 1-2-3 spreadsheet program. Selection criteria appeared in the left column and vendor names across the top. Each criterion was assigned a weighted value from one to 10, depending upon its importance. A score was then developed by the vendor for each criterion and a weighted total score calculated.

Criteria used included throughput, experience with bulk file transfer, data communications expertise, monthly cost-per-store, quality of local support, quality of transmission, the network's technical attributes, grade of service, availability, responsiveness, reputation, stability, network security and references.

Determining the true cost of each vendor's offering was challenging because each vendor had its own complex pricing model that had to be understood in order to make accurate cost projections and comparisons between vendors. To aid this process, the project team developed a spreadsheet model of Cole's transmission traffic, which included transmission characteristics such as the number of characters transmitted, number of transmissions per day and month, length of time for each transmission and the time each transmission occurred.

Each element had pricing and operational ramifications for the vendors under review. Additionally, elements could be modified to optimize the fit to the vendor-pricing models. This fit could then be reflected in the communications design, further reducing costs.

The final cut

The final selection was based upon the total scores from the matrix and the projected costs from vendor-pricing models. Here are the results:

IBM was familiar with Cole's application and offered strong marketing support and an error-correcting protocol. However, its cost-per-store wasn't competitive, and reliability and technical support didn't meet expectations. The AT&T/CDC network offered competitive pricing and strong marketing support, but its track record was limited, and it had no Cleveland references.

AT&T's 800 Service had easy access but suffered from varying levels of quality, lack of management reporting and lack of competitive price at high volumes. Sears featured the SDLC protocol, but costs were much higher (\$565 per store), and their representatives didn't understand Cole's needs.

Telenet, one of the finalists, had strong marketing and technical support, a history of success, competitive pricing and the largest market share in the industry. On the other hand, some smaller locations didn't have redundant hardware at some nodes.

CompuServe, another finalist, also featured strong marketing and technical support, a history of success and the lowest price, and all of its nodes had redundant hard-

ware. On the down side, CompuServe didn't have nodes near all store locations but offered indirect access through other value-added carriers and 800 service. Both finalists were willing to negotiate on price and offered discounts.

CompuServe and Telenet scored very closely, so 38 different criteria were compared to make a final decision. Either vendor would have been a good choice, but Cole selected CompuServe because its projected costs were lower and all nodes had redundant hardware.

Telenet's prices seemed lower at first, but CompuServe's billing model better fit Cole's transmission model. While Telenet offered discounts for use during specific time periods, CompuServe offered discounts depending upon how much the traffic could be spread out over time. The ability to spread traffic for RIS also reduced peak traffic and the number of network-access lines needed to accommodate it. Additionally, computer processing could be moved to non-peak hours, further spreading out traffic.

In October, the project team installed CompuServe's X.25 interface to Cole's IBM front-end processor with IBM's NCP Packet Switching Interface (NPSI) software. This ultimately proved to be the right decision, but the road to success over the next four months was rough.

Cutover to CompuServe

Once the network was implemented and all software reprogrammed, the 26-store pilot was moved in phases from the IBM network to CompuServe. Small groups of stores at a time were moved over several months to minimize the impact of any network or software problems and to test the major selection criteria.

The project team then scrutinized CompuServe's technical and marketing staff expertise, throughput, transmission quality and reliability, management reporting capabilities, and the reliability of pricing and the project team's usage model. Quality and reliability were tracked using reports from the mainframe, discussions with store personnel and formal trouble ticketing with the help desk and the telecommunications department.

To test the ability of the software, hardware and network to recover from a failure, the team identified all potential points of failure, then caused failures at these points and monitored the results. The outcomes led to changes in the application software and network design.

All areas tested favorably except throughput, which is an area with major cost and equipment capacity implications. Throughput reflected network quality, design and technology and affected costs. Therefore, goals and standards for throughput were established and defined in terms precisely analogous to the actual application. These proved to be critical to achieving success.

Some of the techniques used to

improve throughput included running another group of tests during peak processing hours to determine realistic throughput, using copies of real data files and devising tests that isolated different devices.

The throughput tests were simple and relevant to the way the network would be used. Many throughput tests send single characters or blocks of characters and then perform timings using test equipment. The project team performed these tests, but they didn't reflect the real conditions that Cole's stores would face.

The team then developed a series of tests in which several Personal Computer ATs with large files transmitted simultaneously, while another Personal Computer AT calculated throughput. The minimum standard for this test was to achieve 72 character/sec with eight users simultaneously transmitting on a 9.6K bit/sec access line, counting only data characters. The goal was 85 character/sec. CompuServe averaged an unacceptable 56 character/sec with only five users.

The next few months were spent tracking down the reasons for sub-standard performance and considering alternative approaches. At one point, CompuServe recommended increasing throughput by replacing the X.25 interface with an asynchronous one. This approach required installing additional equipment and was rejected because it increased network complexity and the number of points of failure.

Cole's application was unique, so there were no other users with which to compare the network. To see if the project's throughput standards could be achieved, the project team installed a protocol converter and ran a test without going through CompuServe's network. The results were 100 character/sec. However, because of the software differences between the protocol converter and CompuServe, the comparison was inconclusive. Potential bottlenecks included CompuServe's network, Packet/PC's software and IBM's front-end processor software — NPSI.

All three vendors believed they weren't causing the bottleneck. Telenet believed it could improve throughput, and to break the deadlock, the project team decided to give Telenet a chance to prove its claim.

Telenet's second chance

With both vendors on-line, the team performed head-to-head throughput testing using the Personal Computer test facilities, and real-world testing using the 26-store pilot. Telenet's test results were good: 91 character/sec with 10 simultaneous file transfers. CompuServe, convinced the bottleneck was in its network, began to seek a solution.

This provided the project team with an excellent opportunity to validate its earlier comparisons, and significant differences appeared in costs, throughput and

management reporting. This time, Telenet's price was lower overall, and its throughput better. However, CompuServe's prices were less expensive during the times Cole's stores needed to transmit.

Meanwhile, by making some software changes, CompuServe managed to increase throughput to 85 character/sec. Since it was still the low-cost provider and now met throughput requirements, CompuServe was again awarded business.

Two enhancements rounded out the application and achieved additional cost reductions. New file compression software from Packet/PC reduced the number of characters transmitted and the transmission time by about 70%. With unattended operation, the Personal Computer could call the network without operator intervention, so the calling sequence could be shifted to begin at 7 a.m., spreading usage over more hours and further reducing communications requirements and costs.

With these improvements, the projected cost-per-store dropped to about \$25 per month. Currently in 26 stores, RIS is now being considered for full implementation. Redesign efforts will translate into \$1 million in cost savings per year. But the project's ultimate success was brought about by the cooperation between telecommunications, data processing and user personnel. □

Bankers group to publish POS rules

continued from page 1

ease the interconnection of on-line POS nets, which enable merchants to debit a customer's bank account directly at the point of sale.

Some POS experts say financial institutions have waited for the ABA's POS Task Force guidelines before investing in POS nets that would later need to be revamped to connect to other networks. A number of financial institutions that did not wait for such guidelines had to make extensive software revisions in order to connect their proprietary automated teller machine networks.

The ABA POS Task Force completed work started by an ad hoc committee comprising credit card giants MasterCard International and Visa International as well as nationwide ATM network providers Cirrus System, Inc. and Plus System, Inc.

The guidelines also reflect the input of the Food Marketing Institute, the National Retail Merchants Association, the American Petroleum Institute, the Electronic Funds Transfer Association, the Airline Transportation Association and regional ATM network providers.

The guidelines will enable POS services to be teamed with existing ATM networks and will require

new cards emblazoned with a joint ATM/POS network logo. The new cards will contain data encoded on the magnetic strip that complies with POS guidelines, the guideline authors said.

The guidelines are modeled after American National Standards Institute and International Standards Organization electronic messaging and data interchange formats, according to Jay Levy, a task force technical advisor and senior vice-president of systems and operations for Cirrus System. ABA members will explain the guidelines at a two-day ABA POS workshop in Chicago Oct. 4 to Oct. 6.

While the guidelines spell out the methods for exchanging messages between financial institutions, other issues must be settled in individual contracts between the institutions. "All we did was indicate at the application level the data elements that are necessary for a transaction," Levy said. "We make the assumption — and it may be an overassumption — that all participants will be able to agree on how they're going to talk to one another from a communications protocol perspective.

"I think there has been a great deal of anticipation for these guidelines in the POS market," he added. "Some financial institutions and merchants have been waiting for a standard on which to base their offerings, rather than devel-

op proprietary systems and incur the expense of rewriting software when a standard is published."

Another task force member has a slightly different view. "I'm reluctant to say anybody has totally stopped in their tracks waiting for this thing to be adopted," said Charles Kiser, senior vice-president of electronic banking for Dallas-based First RepublicBank Services Corp. But, he added, the guidelines provide merchants and financial institutions already looking to enter the debit card market with a starting point for negotiations.

Currently, an estimated 17,300 on-line POS authorization terminals are in use, a number expected to expand to 178,000 by 1990, according to the market research firm Carmody & Co. The firm also projects that debit cards will be used primarily in supermarkets and gas stations. However, John Love, publisher of the industry newsletters "Bank Network News" and "POS News," said the debit card's convenient payment method make it ideal for fast food outlets and convenience stores as well.

The most significant part of the guidelines is the requirement for an encrypted personal identification number (PIN) to be supplied with each transaction flowing through the network. To meet that guideline, some current POS providers not requiring a PIN will have to upgrade their terminal equipment and host systems.

Under the guidelines, the POS card and the PIN are treated as a customer signature. If both the card and PIN are presented at the time of transaction, the customer's financial institution absorbs the loss for fraudulent transactions. Merchants assume financial responsibility for transactions entering the network without a PIN.

"You can literally pick this document up and start coding from it," said William Petrarca, chairman of the ABA POS Task Force and senior vice-president for electronic funds transfer strategy at Cleveland-based National City Bank. "There will be deviations from this as technology changes and as we begin to find out things in the evolution of POS," he added.

According to the guidelines, an on-line debit card transaction requires customers to slide a POS card through an in-store authorization terminal and enter their PIN on a keypad attached to it. Data from the card's magnetic strip and the PIN flows to in-store controllers or host computers, which forward the transaction to the merchant's financial institution.

If the customer's account is also at that financial institution, the transaction is authorized there. Otherwise, it is passed to the customer's financial institution through a third-party computer service.

In order to get merchants to accept POS debit cards, the ABA bankers had to agree to provide minimum response times to the merchant location and guarantee a minimum system availability level and transaction approval rate. □

Firms swap minis for PC LANS

continued from page 2

supported 24 workstations at a centralized word-processing center. All documents had to pass through the center and, because the firm employs 170 lawyers and 120 secretaries, document production often slowed to a crawl, said Warren Huff, an attorney with the firm.

"They process nearly 200,000 pages of text a month, and the idea was to move document production closer to the point of origination," Brin added.

The firm, the largest in Dallas, has installed Novell, Inc. local nets running the NetWare operating system at two buildings here. More than 150 Acer Technologies Corp. Acer 900 IBM Personal Computer AT-compatibles are linked to the networks, and an additional 100 will be connected by September.

The two buildings, which are across the street from each other, are linked by an asynchronous gateway, and users on them can communicate through electronic mail.

The larger of the networks has four Novell 68V file servers, each with 1.5G bytes of storage, and 30 Mannessman Tally laser printers. The smaller network has a single 286B Novell file server and five Canon U.S.A., Inc. LBPA-1 laser printers.

Two asynchronous gateways allow personal computer users to access a Wang VS minicomputer, which handles billing, as well as on-line legal research data bases such as West Law, Lexis and Phi

Net.

"Our long-term plan is to have the PC network replace all other devices in secretarial and word-processing applications and to have a completely uniform LAN environment. Right now, there isn't a timing and billing package that runs on the local-area network that meets our needs, so we use the Wang mini for those applications," Huff said.

Brin estimated the cost of the entire network at close to \$1.5 million, including \$750,000 for hardware. "The reason I pressed for a personal computer network [for Johnson & Swanson] was that they had 24 workstations with the mini and, for an equal investment — actually less, if you consider it per workstation — we could provide more than 150 workstations with many more applications and increased flexibility," Brin said.

Huff said the firm uses WordPerfect Corp.'s WordPerfect software, which he said has proven to be well-suited to the legal environment.

"We did a lot of research when we began to move toward distributed word processing — the trend in legal offices today — and found that the PC LAN is a better approach than the minicomputer. It gives higher performance and more flexibility at a lower cost and is almost the perfect topology for a law environment. Lawyers tend to do a lot of one-file/one-user applications, like spreadsheets, and personal computers do that very

well," Huff said.

Terry Ross, systems director for Freytag and Perry, agreed. "The minicomputer merely gave us word-processing applications, but with the personal computer network, we have better communications, more flexibility and expanded capability. Sheer versatility makes it more cost-efficient than the minicomputer," Ross said.

Freytag and Perry, which employs about 60 lawyers, dropped an IBM 5520 minicomputer from its Dallas office a little over three months ago and is removing an IBM System/36 minicomputer from its San Francisco office, Ross said.

The Dallas office has installed a Novell local network that supports 23 Acer 900s, four Mannessman Tally laser printers, one C. Itoh Electronics Corp. high-speed dot matrix printer and one Novell 68V file server. Once installed, the network in San Francisco will use the same equipment. The firm also uses WordPerfect software.

"Initially, we'll have 10 workstations out there [in San Francisco], but as the office grows and expands, the personal computer network will also," Ross said.

Ross said the firm is pleased with the versatility of the personal computer network, and Johnson & Swanson's Warren Huff concurred.

"We are extremely happy with the networks," he said. "We feel they give us the best of all possible worlds: very little degradation, the flexibility to use a lot of different software and the capability to access data bases from individual terminals — all with the backup of a large computer system." □

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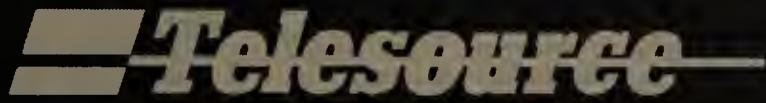
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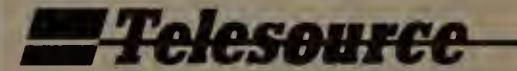
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Users respond to AT&T's plans

continued from page 1

among the group of "select customers" with which AT&T has shared its ISDN PRI strategy.

A list of the first 17 network nodes to support PRI was included in a report titled, "AT&T ISDN Primary Rate Interface Status as of June 15, 1987." The report was written to update key AT&T officials on the status of ISDN PRI implementation in the carrier's network. The document said the project was not proceeding "as rapidly as had been hoped."

The report also said seven to 10 network nodes in major metropolitan areas would be equipped with ISDN PRI support by year's end, with as many as 30 nodes equipped by the end of 1988. The report did not say when AT&T will tariff PRI-based services.

AT&T officials issued a prepared statement in response to the original story and last week declined comment on the issue.

PRI, one of two ISDN interfaces recommended by the Consultative Committee on International Telephony and Telegraphy, specifies how devices such as private branch exchanges are linked to an ISDN network. It delineates how a T-1, 1.544M bit/sec digital link is segmented into 24 64K bit/sec channels. Twenty-three of these channels are B, or bearer, channels that carry voice or data. The 24th channel, or D channel, also operates at 64K bit/sec and carries signalling information that controls the use of the B channels.

Dave Edison, corporate information and communications director for Westinghouse Corp. in Pittsburgh, said he was displeased that, according to the report, Pittsburgh was not among the cities slated to be served by an ISDN PRI node in

the near future.

Edison also questioned why AT&T had not shared its ISDN PRI plans with Westinghouse, one of AT&T's premier customers.

"I would have thought that before making a huge commitment they would have spoken to us to get a feeling for our needs," he said.

The status report said "in some cases, AT&T has shared information with select customers under nondisclosure." Edison said that while members of his department participated in two strategy meetings with AT&T in the past month, AT&T did not discuss PRI implementation.

Tom Scott, a member of the Internetwork operations group for Xerox Corp. in Rochester, N.Y., and president of the EPSCS Users Group, said he was concerned that ISDN PRI support is not initially planned for nodes near Xerox's large network sites. "The question that comes to mind now is why has AT&T left out major cities such as Boston and Dallas?" he said.

Scott said he is not surprised that AT&T's ISDN implementation plans are moving more slowly than the carrier hoped, adding, "If they are having problems with ISDN, I wouldn't want to be the first customer to use it."

After reading the information contained in the report, Gevenie Delsol, director of corporate business communications with Levi Strauss & Co., said, "ISDN is not well enough defined for us to use. I haven't targeted ISDN until 1993. Nothing has happened to change that."

Despite questions about AT&T's strategy, some users said the carrier's ISDN moves will have little im-

pact on them because they have not yet begun planning for ISDN.

Tom Frenette, network communications manager for Black & Decker Corp. in Towson, Md., and president of the AT&T System 85 Users Group, said ISDN will be best suited for companies with large telecommunications staffs. "Only the huge users, like a General Electric Co., which have a staff of 200 or 300, will jump right into ISDN early on. Even if ISDN were available today, I wouldn't be able to do anything with it because of the size of my staff," he said. Frenette manages a four-person communications department.

Black & Decker is currently in the midst of a network upgrade project. "We are extremely busy upgrading old analog facilities and systems. This project, which I have been working on for three years, will probably take two more years," Frenette explained.

Like Frenette, Jim Hopp, network planning and development director for Unisys Corp., said his company is involved in a huge networking project. Hopp and staffers are attempting to merge the communications networks of Sperry Corp. and Burroughs Corp.

"Our first priority, because of the network consolidation project, is to find the quickest and easiest means of delivering service to end users," he explained. "Although we expect to have requirements for ISDN, it will not be needed for another three to five years."

Hopp said users of central office-based services, such as Centrex, would likely embrace ISDN before large private network users such as Unisys.

However, he said the company's five-year strategic plan, which is currently being created, will contain a requirement for ISDN at a later date. □

CALENDAR

Aug. 11-13, Boston — MACWORLD Expo. Contact: Mitch Hall Associates, P.O. Box 860, Westwood, Mass. 02090.

Aug. 17-21, Dearborn, Mich. — Understanding Computer-Integrated Manufacturing. Contact: SME Center for Professional Development, 1 SME Drive, P.O. Box 930, Dearborn, Mich. 48121.

Aug. 19-21, San Francisco — Network Planning and Design with New Technology. Also, Sept. 14-16, Anaheim, Calif.; Sept. 21-23, Minneapolis. Contact: Zaytko Associates, 202 Fashion Lane, Tustin, Calif. 92680.

Aug. 20-21, Cincinnati — An Intensive Introduction to T-1 Networking. Contact: Douglas Grube, Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015.

Aug. 27-28, Washington, D.C. — IBM's Systems Application Architecture. Also, Aug. 31-Sept. 1, San Jose, Calif.; Sept. 28-29, Boston. Contact: Gen2 Ventures, Suite D-5, 12930 Saratoga Ave., Saratoga, Calif. 95070.

Sept. 11, Minneapolis — The Future of Telecommunications Competition and Regulation: What's in the Public Interest? Contact: Patty Manske, The Humphrey Institute, Suite 235, 301 19th Ave. S., Minneapolis, Minn. 55455.

Sept. 16, Minneapolis — The T-1 Network Exchange. Also, Sept. 17, Rosemont, Ill.; Oct. 7, Houston; Oct. 8, Dallas. Contact: Bernice Josephs, Avanti Communications Corp., Aquidneck Industrial Park, Newport, R.I. 02840.

Sept. 17-18, Atlanta — Understanding ISDN. Also, Oct. 19-20, Washington, D.C.; Nov. 9-10, New York; Nov. 19-20, Orlando, Fla. Contact: Telecommunications Research Associates, P.O. Box 1200, Newark, Ill. 60541.

Sept. 21-23, McLean, Va. — BOC Data Services Strategies Conference. Contact: Sharon Feinstein, TeleStrategies, Inc., Suite 100, 1355 Beverly Road, McLean, Va. 22101.

Sept. 21-23, Chicago — Introduction to Data Communications. Contact: Systems Technology Forum, Suite 150, 10201 Lee Highway, Fairfax, Va. 22030.

Sept. 23-25, Chicago — Hands-On T-1. Also, Oct. 7-9, Boston; Oct. 14-16, Detroit; Oct. 28-30, Washington, D.C. Contact: American Institute, 55 Main Street, Madison, N.J. 07940.

Sept. 28-30, Washington, D.C. — Network Protocols and Standards. Contact: Systems Technology Forum, Suite 150, 10201 Lee Highway, Fairfax, Va. 22030.

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► PRODUCT REVIEW

Put data where your voice is

Data-over-voice system vendors aim to offer users a LAN alternative.

BY JOHN J. HUNTER

Contributing Writer

Data-over-voice (DOV) systems have received a lot of attention as an alternative to full-blown local-area networks. These systems operate with the user's in-place telephone wire, letting data and voice share the same transmission path. They do this by superimposing data on top of the voice bandwidth and letting a private branch exchange or Centrex system separate the inputs and route them to their destinations.

But data-over-voice products have also been rapped because of their slow data transmission speeds, lack of integrated switching facilities and inability to handle personal computer-to-personal computer communications. Those limitations are now being eliminated with products such as Teltone Corp.'s TellAN and Gandalf Data, Inc.'s Dovtrex.

Both systems let voice and data share a single twisted-pair telephone line and support data switching without using a PBX. The Dovtrex controller is a repackaged Gandalf PACX 2000 data switch configured for voice and data. The TellAN and Dovtrex controller units separate the voice signals and send them to a PBX. Data switching, however, is handled directly by Dovtrex and TellAN — with no assistance from a data PBX, as is the case with many data-over-voice products.

TellAN transmits data between nodes at 1M bit/sec. By contrast, the Dovtrex sends at 19.2K or 64K bit/sec over twisted pair and at 9.7M bit/sec over fiber-optic links. The highest input speed accepted by TellAN, however, is only 19.2K bit/sec asynchronous, as opposed to 64K bit/sec synchronous for the Gandalf unit. TellAN also offers a personal computer adapter board and comes with Network Basic I/O System-compatible software, which supports NETBIOS-compatible operating systems. The software permits personal computer-to-personal computer communications and supports file transfer; it also supports file servers.

TellAN's personal computer software also includes Digital Equipment Corp. VT100 emulation for communications with dumb terminals. In addition, standard TellAN software allows both dumb terminal and personal computer users to establish and maintain up to five concurrent sessions.

Dovtrex also supports personal computer-to-personal computer communications and dumb terminal emulation via its Link 2000 software. The maximum number of

concurrent sessions per terminal, however, is two.

The main components of TellAN are the network interface unit (NIU) and the hub. The NIU is a multiport, programmable hardware device that interfaces data and telephone inputs to telephone lines. The hub, usually located in the wire closet, separates the voice and data, routing voice to the PBX or Centrex and data to the addressed end point, which can be a computer port, a file server or another terminal. Data transfers between the NIU and the hub at 1M bit/sec.

Gandalf's equivalent to the NIU is the DOV unit, available as a 640 or 6400 model; hub functions are handled by the Dovtrex controller. The data transfer rate between the DOV units and Dovtrex is up to 64K bit/sec. Both vendors also offer gateways to Ethernet and token-passing local-area nets.

TellAN and Dovtrex use a distributed architecture with a star

TellAN's extensive data handling is derived from its NIUs, which accept inputs from up to 96 channels and statistically multiplex them over a single twisted-wire line. NIUs are offered in versions that interface one, eight, 16 or 96 data input channels.

The 96-channel NIU is actually a 19-in.-wide wall-mountable enclosure that holds up to six 16-channel NIU cards and uses only one wire pair to send data to the hub. Unlike the 1-, 8- and 16-port NIUs that also accommodate one telephone each, the 96-channel unit can only be used for data transmission. The NIU contains all firmware needed to accept the token, assemble the data packet, indicate target resource addresses and perform error correction. Each data packet transmitted has appended cyclic redundancy check characters the receiving NIU uses for error checking.

Gandalf's DOV 640 is limited to two ports, one for a data device

64K bit/sec or over fiber-optic links at 9.7M bit/sec for up to 3.1 miles.

The Dovtrex's capacity is also greater. Each TellAN Hub accommodates 12 or 24 telephone lines, and up to 256 NIUs are configurable. In addition, up to five hubs can be linked, giving a system capacity of 4,096 channels.

Each Dovtrex unit has two shelves that accommodate 120 inputs. Up to seven shelves can be linked to form a node, and up to 32 nodes are supported. Thus, a fully configured system has 23,500 attached devices.

Contention solutions

TellAN and Dovtrex do an outstanding job of handling resource contention. If a called resource is busy, callers are queued to it, and their positions in the queue are indicated. With the Dovtrex, the system administrator can assign users higher priority levels that guarantee they get first shot at the resource. The system administrator can even force disconnection, if necessary. TellAN doesn't support priority access in any form.

Through a call-management menu, TellAN operators can view their call (session) numbers, call status and the names of the resources to which calls are connected. Through the unit's multiple-session facility, users can put calls on hold, hot key to another call and return to the on-hold calls without breaking communication. Dovtrex supports user hotkeying between two logical sessions.

Another capability at the TellAN user's disposal is call interrupt, which allows calls in process to be interrupted if an important event occurs.

For example, if users are queued to a resource, they can place that call on hold and switch to another session. When the resource is available, the system will interrupt the session to inform operators of the resource's availability. Gandalf doesn't have this capability. If users queue to a resource, they're not permitted to switch to another session and still remain queued.

Both products have advantages. TellAN provides switching at the terminal interface level and furnishes excellent session management and resource queuing services through its interrupt capability.

The multiplexing performed by the NIUs reduces the number of interface cards, and Dovtrex doesn't match the TellAN's error-correction capabilities. But Dovtrex supports more devices and higher data rates, and it allows users to construct larger networks.

In addition, TellAN limits the number of phones to one per NIU, which could diminish its appeal to traditional data-over-voice users. □

Two popular peer-to-peer packages compared

	Vendor/Product	
	Gandalf Technologies, Inc. Wheeling, Ill./ Dovtrex	Teltone Corp. Kirkland, Wash./ TellAN
Devices supported	23,500	4,096
Maximum data rate	19.2K bit/sec asynchronous 64K bit/sec synchronous	19.2K bit/sec asynchronous
Cost per port	\$450	\$425 to \$525

SOURCE: TMS CORP., DEVON, PA.

topology and are configured by the system administrator. Both provide menus the system administrator uses to configure each channel for such operations as transmission speed and connect/disconnect protocols. The menus also can be used to assign operation restrictions and to provide individual passwords and logon procedures.

Users are also presented with menus that assist with making connections and routing data throughout the network. Both units also permit channels to be permanently attached to resources, making normal connection procedures unnecessary.

Teltone uses the term "token passing" to describe how each node location gains access to the network. The hub unit broadcasts the token to all NIUs, but only the one specifically addressed seizes it. That NIU then removes the data, inserts its data packet, which can be up to 256 bytes long, and passes the token back to the hub.

The hub doesn't separate or buffer received data. Rather, each packet is passed between all NIUs on the network, and only the one addressed can remove the information. Dovtrex handles terminals on an interrupt basis and routes data only to the addressed device.

and one for a telephone. The DOV 6400 model is a rack-mountable eight-port unit that handles one data and one voice input per port. Each port, however, requires a separate wire pair, and no error correction is performed.

The TellAN NIU functions as a self-contained switch that can directly connect devices attached to the same NIU. Intra-NIU switching is a substantial performance advantage for TellAN, since it obviates the need to transmit packets to the hub, data PBX or other switching device and back to the target terminal. With Gandalf, all switching is handled by the Dovtrex controller unit.

Both products support RS-232-C-interfaced devices. The maximum distance between an NIU and hub or between hubs is 1,000 ft. NIU distance can be increased to 18,000 ft via a Teltone DCS Data-Over-Voice unit.

By contrast, the Gandalf unit has far greater transmission range. The DOV 640 can be 12,000 ft from Dovtrex when operating at 19.2K bit/sec asynchronous or 64K bit/sec synchronous, or up to 18,000 ft when running at 19.2K bit/sec asynchronous. Up to 32 Dovtrexes can be linked together through conventional telephone lines at

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